CANADIAN GEOGRAPHICAL JOURNAL

SEPTEMBER
1936

VOL. XIII
No. 5

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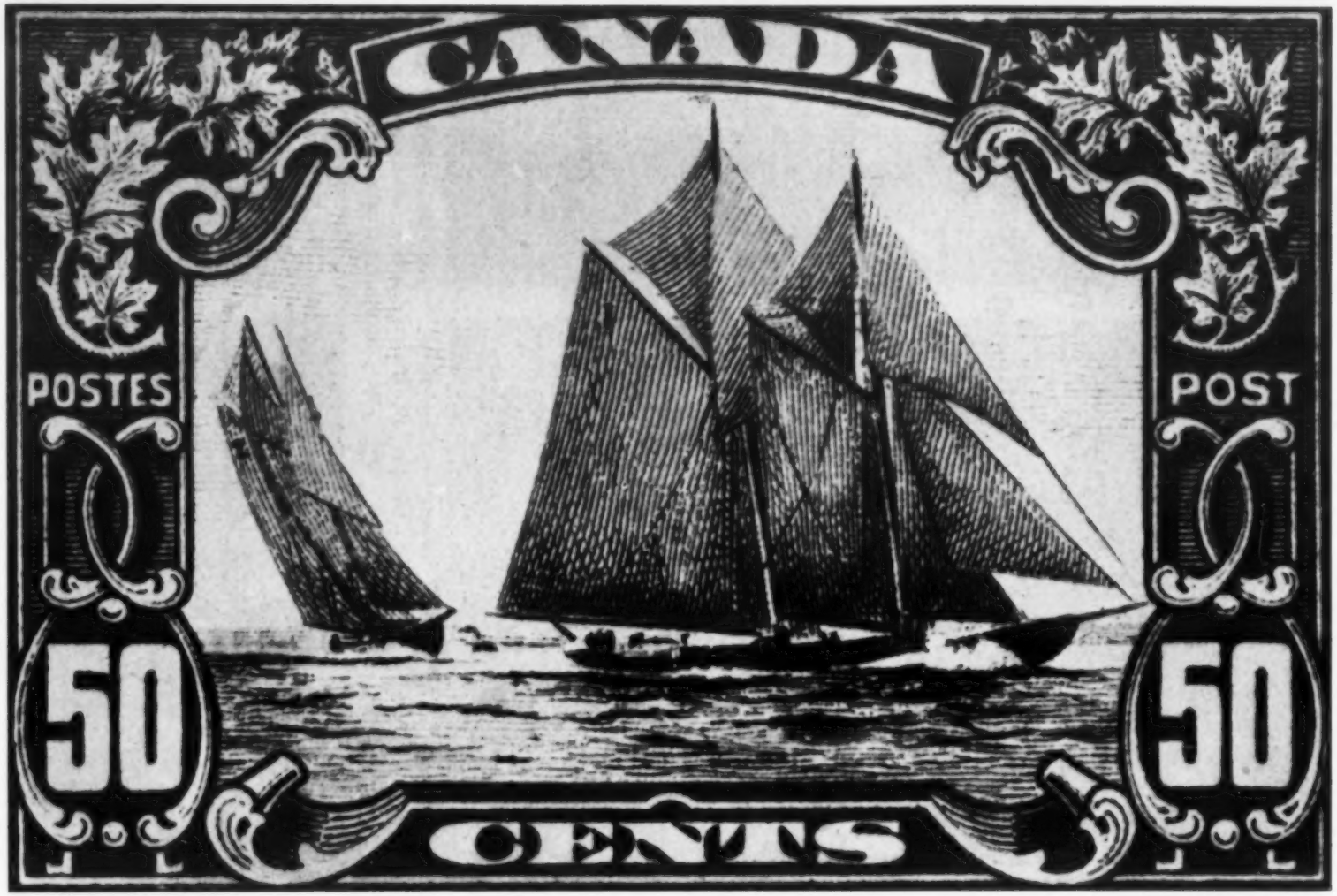

The 50-cents blue denomination of the 1928 set has been widely acclaimed the most beautiful stamp ever made. The internationally famous fishing schooner "Bluenose" was most appropriately selected as the subject to give world-wide publicity to three important phases of Nova Scotian life and industry—fisheries, shipbuilding and seamanship. (See text for fuller details).

CANADIAN GEOGRAPHICAL JOURNAL

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This magazine is dedicated to the interpretation, in authentic and popular form, with extensive illustration, of geography in its widest sense, first of Canada, then of the rest of the British Commonwealth, and other parts of the world in which Canada has special interest.

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COVER SUBJECT—*The 20 cents orange special delivery stamp of the 1927 confederation issue reveals the very heart and essence of Canada. (See text for fuller details)*

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The British standard of spelling is adopted substantially as used by the Dominion Government and taught in most Canadian schools, the precise authority being the Oxford Dictionary as edited in 1929.

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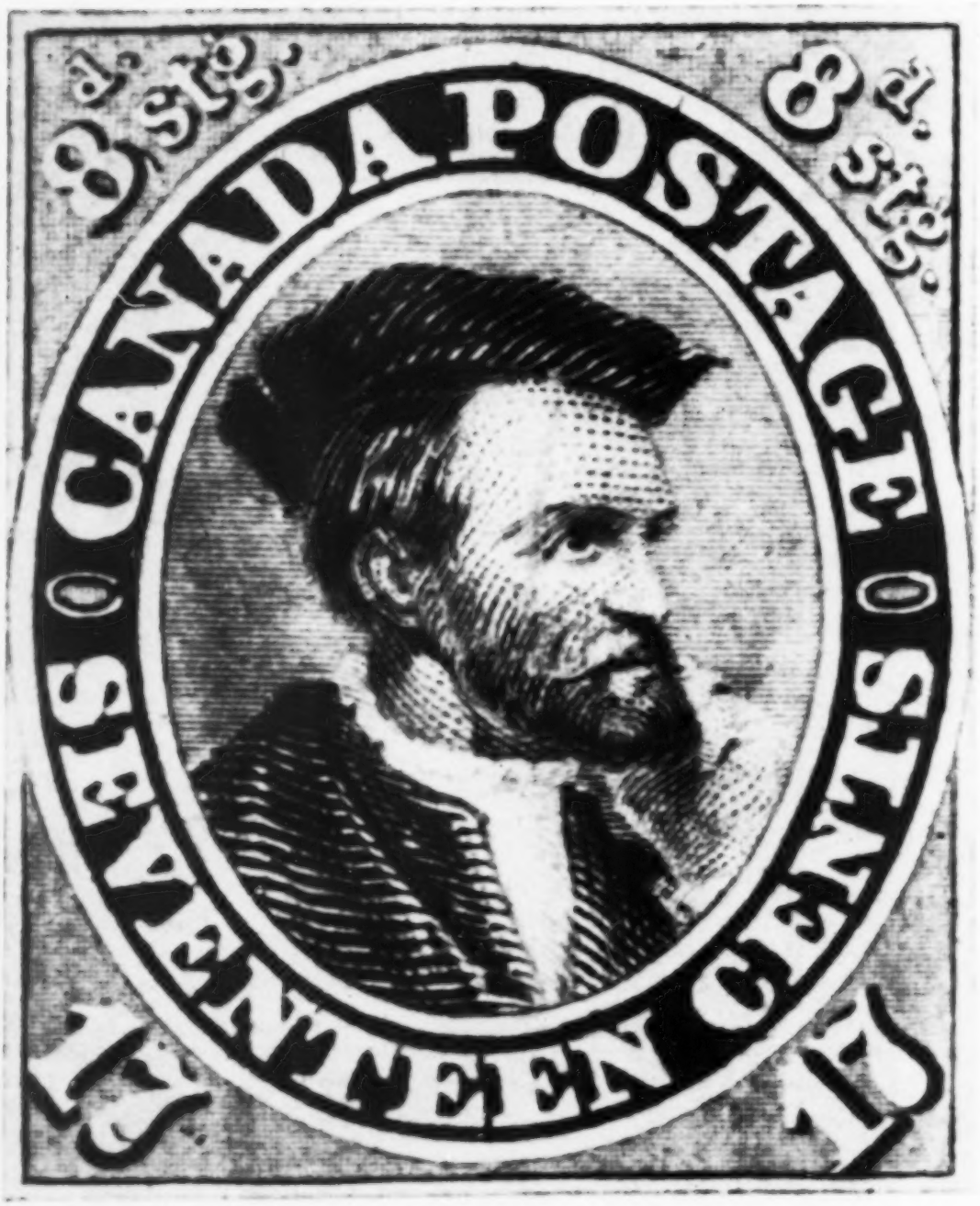


Portrait of Jacques Cartier (not contemporary) on 17-cents stamp of 1859.

CANADIAN GEOGRAPHY AND STAMPS

by **A. STANLEY DEAVILLE**

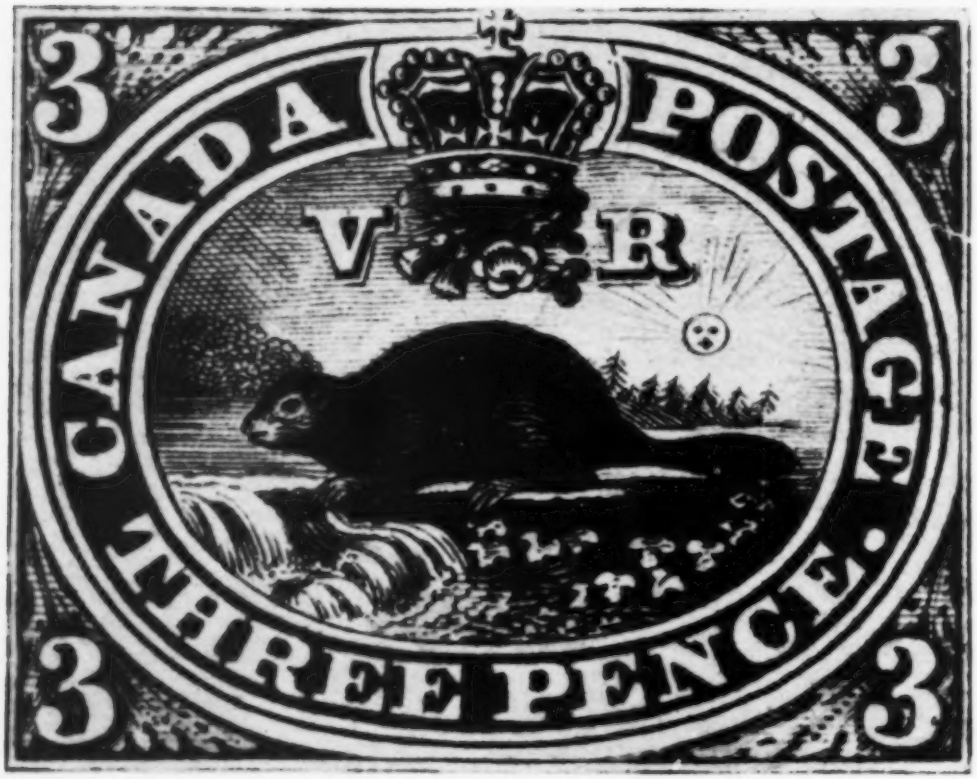
I SUPPOSE most of us at some time or other have heard a fond parent remark delightedly that "Johnnie is certainly learning a lot about geography and history since he started collecting postage stamps." Yet the acquisition of useful knowledge in this painless manner is usually left severely to Johnnie and his juvenile ilk. Philatelists the world over fully realize that our stamps reflect the Canadian scene and outline Canada's history in a quite remarkable manner. They concede that, and the general interest of the subjects used, to a degree that has placed Canadian stamps in the very forefront of philatelic popularity. But those who do not take any special interest in postage stamps often seem strangely unaware of the skilfully-engraved and significant imagery that has been so long spread before their eyes through the medium of His Majesty's mails in Canada. They are quite willing to leave the absorption of that sort of thing to youngsters, or to the "eccentric" individuals who collect stamps. They do not know, nor do they greatly care, whether their telephone or gas bill comes to them prepaid by postage-meter or with a "Weeping Princess", a "Cock-eyed King", or a common or garden stamp that does not flutter the philatelic dovecots. They probably do not notice if it bears a minor masterpiece of engraving and design portraying Cartier's first Canadian landfall, or a faithful representation of the quaint "Sigillum" granted his infant Province of New Brunswick by Thackeray's Third George, under the sign-manual of his Prince Regent. For such indifferent ones this article is written. As readers of this Journal they must be interested in geography, especially in relation to Canada. If that is so they ought also to be interested in the postage stamps of the Dominion, about some of which this article will tell.

Yet human nature being what it is, surely few can remain indifferent when it is known, for example, that the New Brunswick stamp, issued less than two years ago, already commands a premium of from four to five hundred per cent. over its original face value; that a "Weeping Princess" is now easily worth two hundred and fifty times what the Post Office got for it, and that a sheet of one hundred five-cent part-perforated stamps recently sold by an Ontario postmaster at face value was almost immediately re-sold by the lucky purchaser for the tidy sum of one thousand dollars. Such instances could be multiplied, so that considered purely as a gilt-edged investment some Canadian stamps are "not so dusty."

Just what a "Weeping Princess" is may not be clear to the uninitiated. It is a one-cent green stamp of the King George V. Silver Jubilee series of 1935, with a tiny flaw below the right eye of the little Princess Elizabeth, whose portrait appears in the vignette. The presence of this minute spot of ink in the wrong place makes the usually cheerful little lady look as if she was weeping — doubtless as a result of some stiff geography lesson *not* inculcated through the delightful medium of philately and a progressive Geographical Journal. The moral is fairly obvious.

The "Cock-Eyed King" is quite another story. It seems impossible to tie it up in any far-fetched moralizing way with geography, so we had better not go into it now. The one instructive point it conveys to the outsider is that stamp-collecting seems to induce a feeling of familiarity with high personages who themselves indulge in the hobby. Is there a moral for kings and presidents here, or is this all to the good in a democratic age? In mere justice it should be added that the Post Office Department has consistently refused to adopt the ribald nickname affectionately bestowed on the stamp by collectors, and coldly terms it the "Defective Eye" variety.

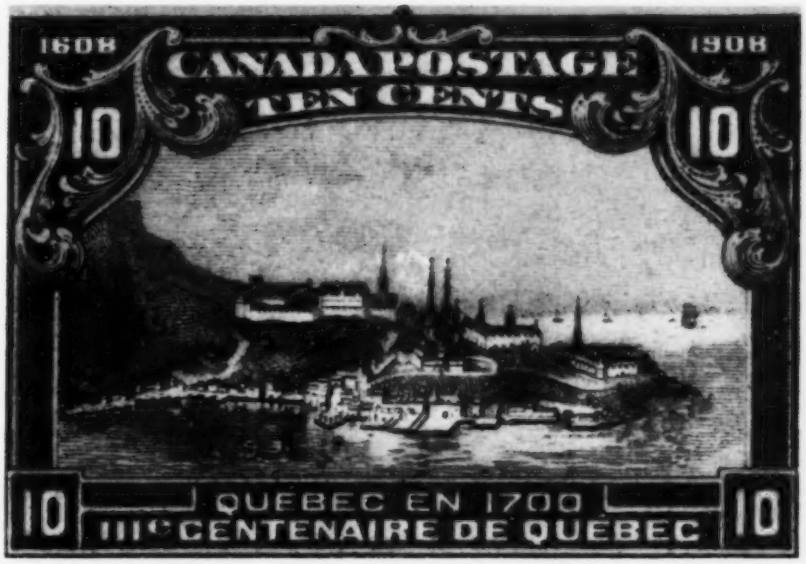
I might go on to tell of the "Enlarged Moustache", the "Moulting Daedalus", false plate numbers, re-entries and other tit-bits of collectors' jargon, but the only result might possibly be the creation of a few more sharp-eyed specialists, complete



Canada's first postage stamp. The "Three pence Beaver" of 1851.

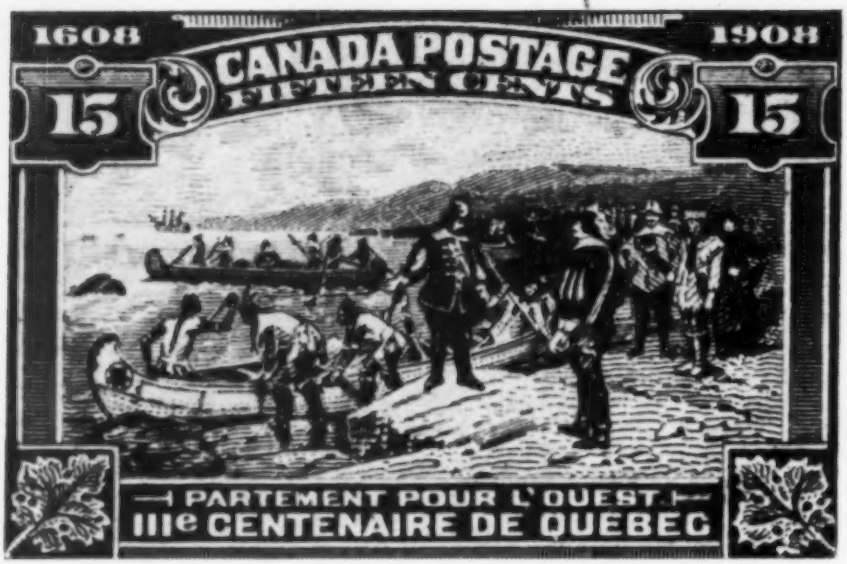
The imperial penny postage stamp of 1898.

Quebec Tercentenary issue of 1908. Portraits of Cartier and Champlain.



Quebec Tercentenary issue of 1908. View of Quebec in 1700.

Quebec Tercentenary issue of 1908. Champlain's "Habitation" at Quebec.



Quebec Tercentenary issue of 1908. Champlain's departure for the West.

Confederation issue of 1927. Map of Canada, 1867-1927.

Quebec Tercentenary issue of 1908. Cartier's arrival at Quebec in 1535.

with magnifying glasses and tweezers, perforation gauges and other impedimenta, all inspired by collectors' itch and possibly by a sordid hope of gain. And that is not what I started out to do.

The very first Canadian postage stamp, the well-known "Threepenny Beaver" of April, 1851, was a "pictorial" of first-rate geographical and general significance. The subject, hackneyed now, is so thoroughly indigenous that one can hardly think of a more fitting commencement for the philately of the Dominion. The symbolic character of the animal's intelligence, resourcefulness and industry, the ramifications of the fur-trade, the subject of beaver-colony *locale*, the genesis of the lumbering industry and the harnessing of water-power—here is material for volumes on industrial and geographical Canadiana ready to our hand.

The portrait of Jacques Cartier appeared in 1855, and again in 1859, and the Beaver motif was repeated in the 5-cents stamp of the latter year. Thereafter Canada's stamp designs were confined to royal portraiture until the famous and much-criticized "Map Stamp" of 1898 made its appearance. That stamp, issued to commemorate the establishment of Imperial Penny Postage, was geography with a vengeance. On an engraved outline map of the world on Mercator's projection, printed in black, were lithographed the seven seas in blue, and the British Empire in red. Some unsympathetic persons went so far as to say that in their arrogance the imperialists reddened some portions of the world that were not then British but became so later! The crowning touch was the addition of Sir Lewis Morris's line, from his "Song of Empire"—"We hold a vaster Empire than has been!" The line is taken from the following portion of the poem, written by the Welsh Bard as a Diamond Jubilee Ode in 1897:

> We hold a vaster Empire than has been!
> Nigh half the race of man is subject to our Queen.
> Nigh half the wide, wide earth is ours in fee,

And where her rule comes all are free! Imperialism, said the scoffers, could no further go; and they dubbed it the "has-been" stamp; and the Honourable Mr. William Mulock, then Postmaster General, who was credited with having sponsored the idea, dropped in for some warm criticism. But the stamp has survived the criticisms, as does the venerable Sir William. In the course of successsive printings the "seven seas" changed colour, or rather shade, several times, and in some stamps the British Empire forgot to blush becomingly. But these are vagaries of interest chiefly to the philatelist. As cartography, it must be admitted, the stamp is only so good as can be expected of such small dimensions. But at least it brought home to many some true sense of the vastness of the British Empire.

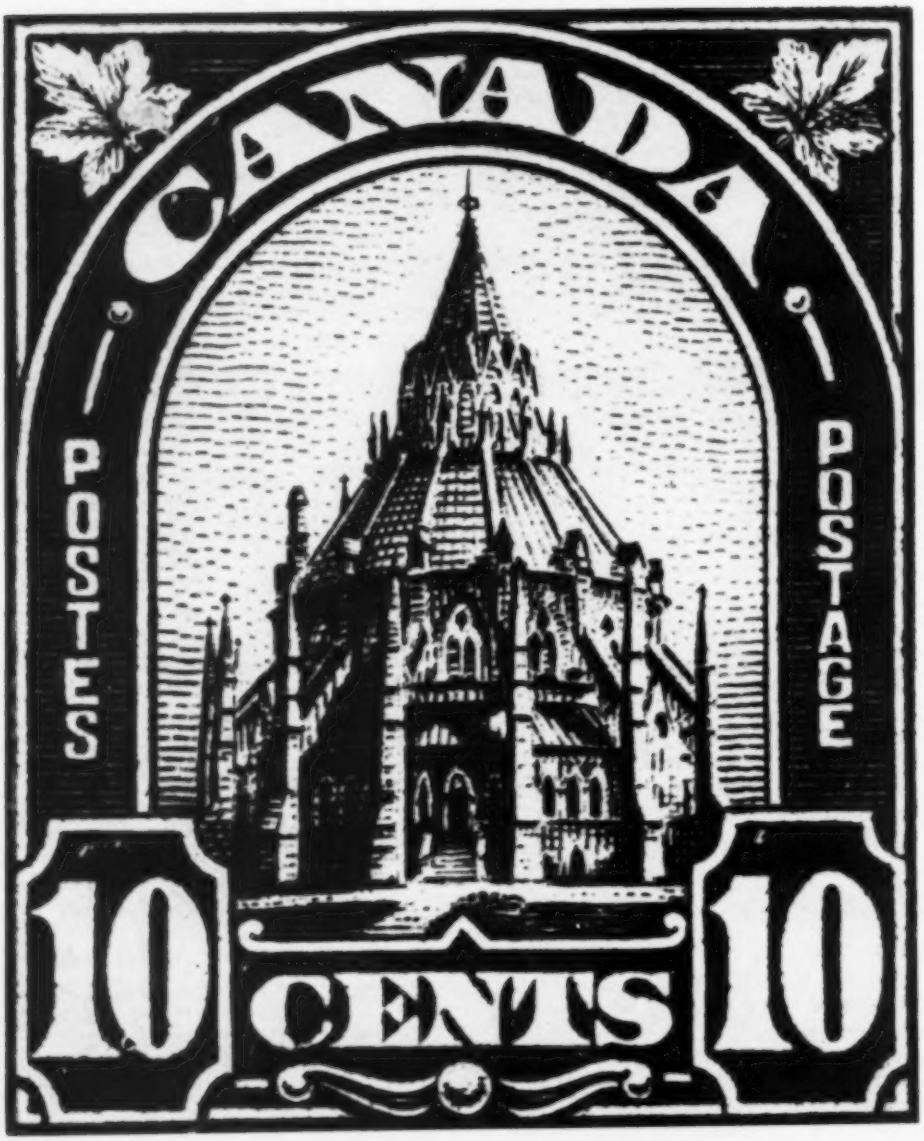
As leading proponent of the actual adoption of Imperial Penny Postage, Canada, and particularly its Postmaster General, naturally took pride in the achievement, and may be pardoned for commemorating the event by means of the most suitable medium—a postage stamp covering the new rate.

Chastened, perhaps, by this much-criticized plunge into geography and imperialism, Canadian stamp designs reverted to royal portraiture for nearly ten years, until the appearance in 1908 of the Quebec Tercentenary Issue, Canada's first pictorial and commemorative set of stamps. The 1-cent stamp bears the portraits of two great explorers, Cartier and Champlain, and the 5-cents, 10-cents, 15-cents and 20-cents denominations depict scenes in the early history of New France.

It was only to be expected that Canada should celebrate in fitting style the three hundredth anniversary of the founding of her first permanent settlement by Samuel de Champlain in 1608. The commemoration ceremonies took place at Quebec during July, 1908, and the interesting series of stamps was issued at Ottawa on the 16th of that month.

Champlain's narrative of his Third Voyage contains the following entry:—"With our canoes laden with provisions, our arms and some merchandise to be given as presents to the Indians, I started on Monday, May 27, from the Islands of Saincte Helaine, accompanied by four Frenchmen and one Indian. A salute was given in my honour from some small pieces of artillery."

The 15-cents stamp splendidly depicts this scene, and is lettered "*Partement pour l'ouest*"—an interesting use of an obsolete French word now superseded by the modern "*départ*". The same note is re-echoed by the inscription on the 5-cents stamp, which reads "*L'abitation de Québecq*". The 20-cents stamp depicts "*Arrivée de*

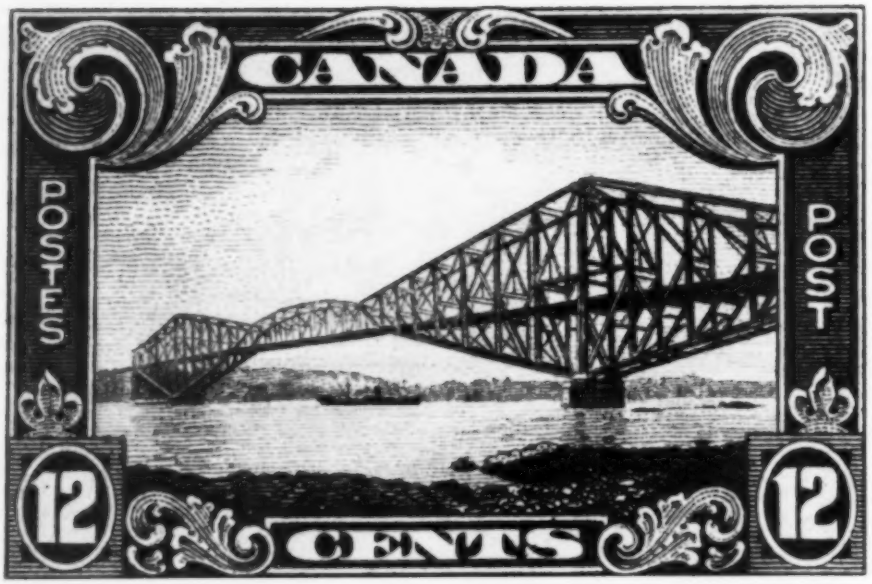


Pictorial issue of 1928. Library of Parliament, Ottawa.

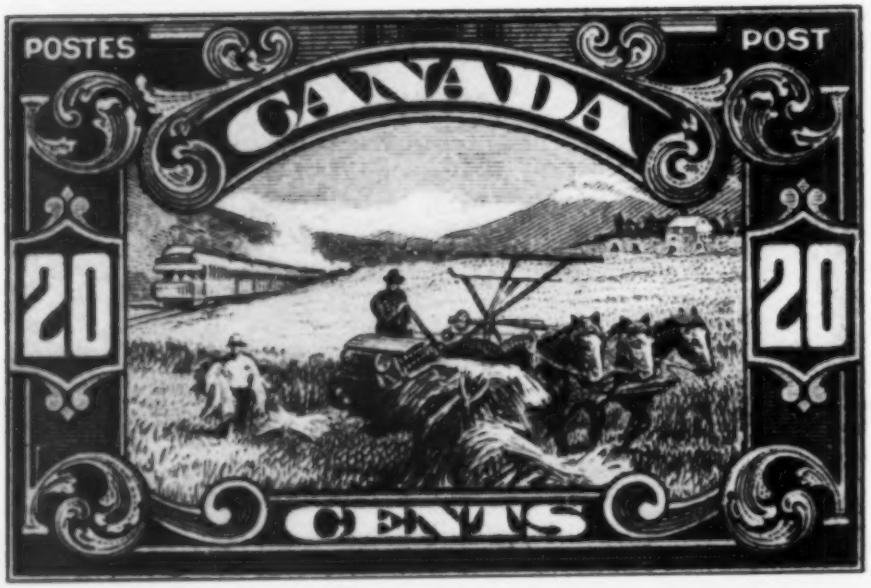
Pictorial issue of 1928. The Parliament Buildings, Ottawa.

Confederation issue of 1927. "The Fathers of Confederation" by Robert Harris, C.M.G.

Pictorial issue of 1928. View of Mount Hurd, Canadian Rockies.



Pictorial issue of 1928. View of Quebec cantilever Bridge.



Pictorial issue of 1928. Harvesting in the Canadian West.

Cartier—Québec, 1535" and the 10-cents bears a view of "*Québec en 1700*".

The remainder of the series is made up of portrait stamps, as follows:—½-cent, portraits of the Duke and Duchess of York: 2-cents, portraits of King Edward VII and Queen Alexandra: 7-cents, portraits of Montcalm and Wolfe.

Nearly a decade elapsed before Canada again issued a pictorial stamp. The fiftieth Anniversary of Canadian Confederation in 1917 was an event which called for suitable philatelic commemoration. A large-sized 3-cents stamp, brown in colour, was issued on the 15th September, based on the well-known oil painting "The Fathers of Confederation" by Robert Harris, C.M.G., which hung for many years in the Railway Committee Room of the old Parliament Buildings at Ottawa, and was destroyed when those buildings were burned in February, 1916.

The same design was used again in 1927, when the Diamond Jubilee of Canadian Confederation was celebrated in fitting style and a series of six special stamps was issued. The date of issue was 29th June. The vignette of the 2-cents green stamp of this series was also taken from Harris's painting. The 3-cents carmine stamp bore an excellent engraving of the new Parliament Buildings at Ottawa. Two of the stamps were of special geographical interest. The 12-cents blue stamp bore a map of Canada showing the political boundaries in 1867 and 1927. This attractive design shows geographically the growth of Canada from the nucleus of 1867 to the magnificent sweep of the full-grown Dominion from sea to sea.

The 20-cents orange Special Delivery stamp of this series is a noteworthy design for several reasons. A writer in the New York "World-Telegram" recently expressed the opinion that "of all the stamps issued throughout the world since 1840 there is no single adhesive more interesting or instructive" than this stamp. This is indeed high praise. To the outsider, as well as to the Canadian himself, the tiny engraving reveals the very heart and essence of Canada.

Through a Gothic window casement, symbolizing the old-world culture from which the Canadian people sprang, we see five different methods of mail transportation against a background which reveals something of our country's vastness, beauty and diversity.

Overtopping the scene is a lofty peak, typical of Canada's great mountain ranges. This is a free rendering of Mount Cathedral, in Yoho National Park, Alberta. In the foreground is a railway line along which a transcontinental train is speeding, and between the mountains and the foreground is an arm of the sea down which an ocean liner steams majestically. In the foreground there is a stretch of ground suggestive of the prairies, with a "pony-express" rider carrying a mail bag on which appears a philatelic *tour de force*,—the smallest bit of engraving ever attempted on a postage stamp. On the mail bag, so small as to be indecipherable by the naked eye, appear the words "Canada P.O." It will interest the connoisseur of fine engraving to know that this delicate piece of work was carried out by the Canadian Bank Note Company of Ottawa which engraved and manufactured the entire series of 1927 Confederation stamps, as well as the outstanding "pictorials" of 1928.

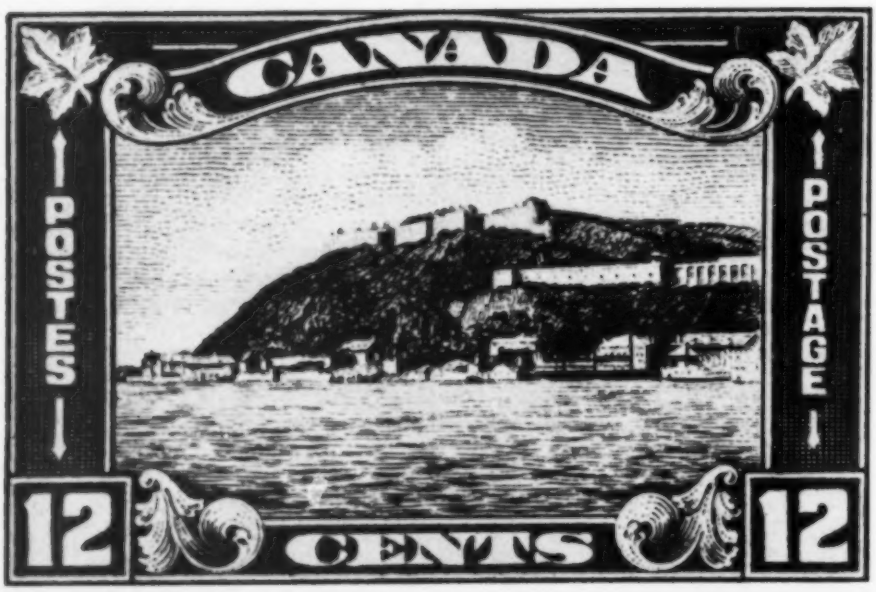
Two more methods of Canadian mail transport are depicted on this interesting and ingenious stamp. Beyond the train, on a stretch of snow-covered ground, a dog-train mushes along with His Majesty's mails. And in the sky, to complete the picture and bring it up to date, are two air-mail planes, off to the hinterland. These two modes of mail conveyance are sharply contrasted, yet quite characteristic of the Canadian background, for they are both in general use throughout the remote areas which cannot be readily served in other ways; and the aeroplane is slowly but surely winning its way as a mail carrier between Canada's widely separated urban centres.

Hitherto pictorial stamps had been issued in Canada for commemorative purposes only, but in 1928 the Post Office Department decided to use the higher denominations of its regular postage stamp issues to depict characteristic phases of Canadian life and industry throughout the Dominion, instead of the familiar royal portraiture. The first series of designs, selected by the Department and carried out by the Canadian Bank Note Company of Ottawa, was an unqualified success, and at once took its place among the most noteworthy contributions to twentieth century philatelic art.

The lower and more widely-used stamps, up to and including the 8-cents value, continued to bear the portrait of

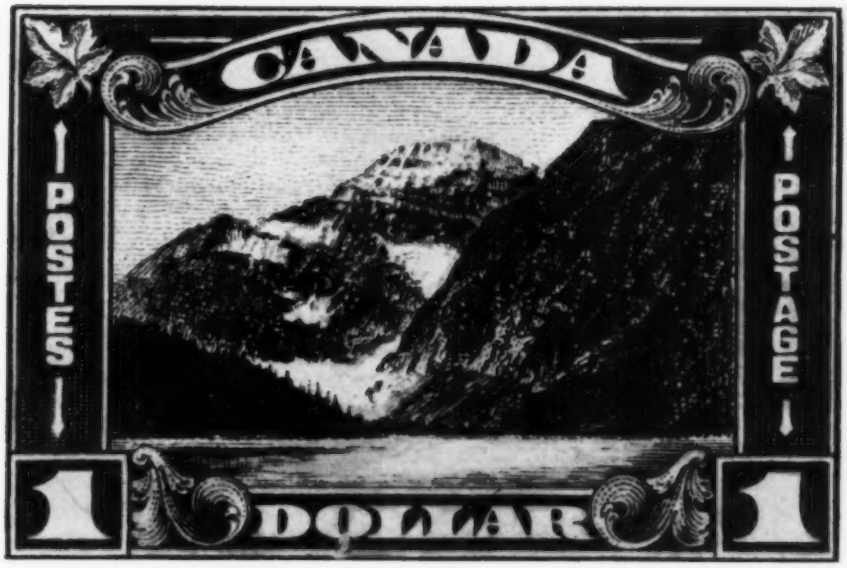
Pictorial issue of 1928. Harvesting on the Canadian Prairies.

Pictorial issue of 1928. Scene of Grand Pré, Nova Scotia.



Pictorial issue of 1928. The Citadel, Quebec.

The "Royal William" commemorative stamp of 1933.



Pictorial issue of 1928. View of Mount Edith Cavell, Canadian Rockies.

Postal Union issue of 1933. View of Parliament Hill, Ottawa.

King George V. Commencing with the 10-cents denomination, pictorial designs were adopted. The 10-cents green stamp, issued on the 5th December, 1928, consisted of a vignette based on an oil painting entitled: "The Ice-Crowned Monarch of the Rockies", by Frederick M. Bell-Smith, an Englishman by birth who was at one time Director of the Toronto Art School. The painting was reproduced by kind permission of the owner, Mr. R. D. Hume, of Toronto. It depicts Mount Hurd, in the Ottertail Range of the Canadian Rockies. At either side is a Totem Pole of the Canadian Rockies. At either side is a Totem Pole of a bear fraternity belonging to a British Columbian tribe of Indians.

The 12-cents carbon blue stamp of this series was issued on 9th January, 1929, together with the remaining stamps of the set. It is a beautifully engraved picture of the great Quebec cantilever bridge, which is numbered among the outstanding engineering achievements of its kind. Railways and engineering thus find a place in the important scheme of philatelic publicity which the Post Office Department has quietly carried on for nearly ten years to familiarize Canadians and the outside world with the wonders of this Dominion.

Western harvesting and wheat-growing form the subject of the 20-cents red stamp of this series. Horse-drawn equipment and small scale farming are shown, as distinct from motor equipment and large scale grain-growing shown in a later stamp. A Canadian transcontinental train, with mountain scenery in the distance, form the background of the scene.

The 50-cents blue denomination of the 1928 set has been widely acclaimed as the most beautiful stamp ever made. Certainly in the minds of many philatelists it holds first place. Within a massive frame of maple leaves and scroll-work is a masterly engraving of the internationally famous fishing schooner "Bluenose" and the United States contestant, "Columbia", from photographs taken on the occasion of the International Fishermen's Race off Halifax Harbour in the autumn of 1926. The picture is a composite one, but in arrangement care was taken that any variation in sailing points shown by the two vessels was within the bounds of practical offshore sailing. It is perhaps needless to add that the race was won by the "Bluenose".

The Department, in selecting this subject, gave world-wide publicity to three important phases of Nova Scotian life and industry—fisheries, shipbuilding and seamanship.

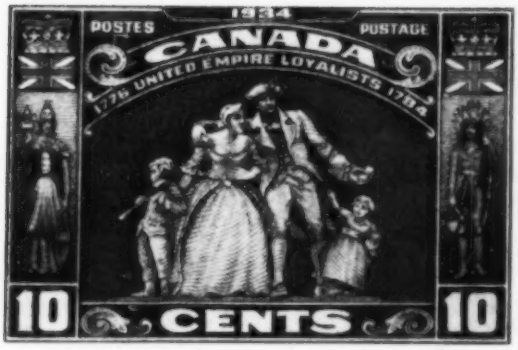
The "Bluenose" was built at Lunenburg, Nova Scotia, in 1920-1921, by Smith and Rhuland. With the exception of the masts she is contructed throughout of Nova Scotian timber — spruce, oak, birch and pine. Notwithstanding her remarkable racing record she was used as a practical fishing schooner year after year, with a crew of twenty men and a successful record of catches. She was on display at the Century of Progress Exhibition in Chicago in 1933, and proceeded to England in 1935, where she was in line at Spithead when the late King George reveiewed the British Fleet for the last time.

The $1.00 olive green stamp of the 1928 series bears an engraving of the central portion of the Parliament Buildings at Ottawa, similar to that appearing on the 3-cents carmine of the 1927 Confederation set.

In 1930 a change of contract neccessitated a new King's head and pictorial issue of stamps. The new contractors, really a very old firm with a fine record in Canadian philately, but who had not made a postage stamp for many years—the British American Bank Note Company, of Ottawa—could hardly be expected to attain the technical excellence of their predecessors at one immediate bound. The new stamps were interesting and valuable as to subjects, but not generally considered equal to the 1930 series in engraving or finish.

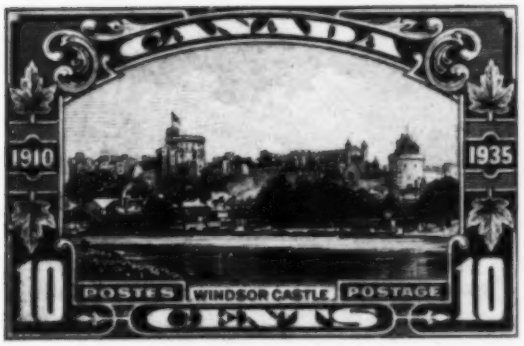
The 10-cents stamp, olive green in colour, shows the remarkable Gothic library of Parliament in Ottawa, so fortunately saved from the disastrous fire of 1916, which destroyed the rest of the central buildings. The harmonious lines of the Library are well shown in the small stamp—the only Canadian pictorial stamp of ordinary size issued since Conferedation.

The 12-cents grey design shows the grim outlines of the Citadel at Quebec, overlooking the St. Lawrence River. The 20-cents red stamp shows a prairie harvesting scene on a large scale, with modern equipment, and grain elevators in the distance. The 50-cents blue stamp bears a composite picture of the museum, statue and old well at Grand Pré, Nova Scotia, the Acadian home of Longfellow's fictive



The "United Empire Loyalists" commemorative stamp of 1934.

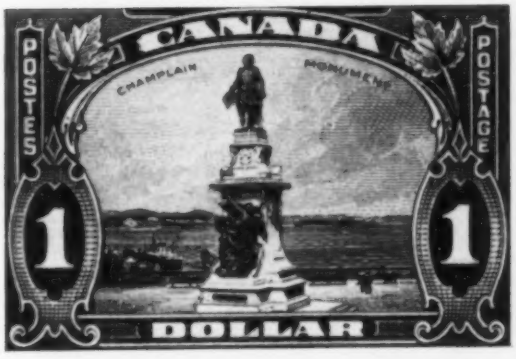
Pictorial series of 1935. Royal Canadian Mounted Police constable.



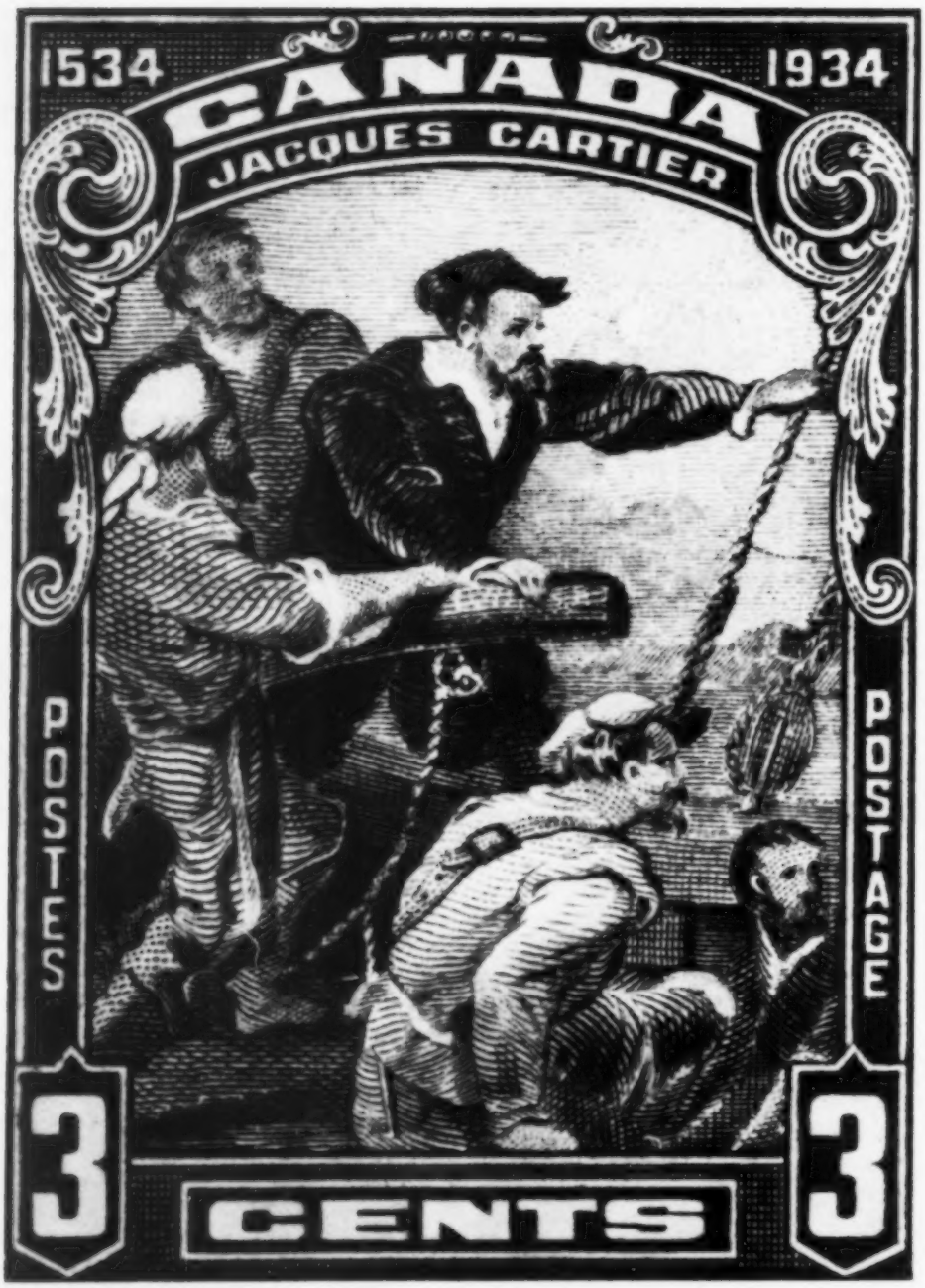
The "Windsor Castle" stamp of the King George V Silver Jubilee series of 1935.

Pictorial series of 1935. Niagara Falls.

Pictorial series of 1935. Legislative Buildings, Victoria.



Pictorial series of 1935. Champlain Monument, Quebec.



The "Jacques Cartier" commemorative stamp of 1934.

heroine, Evangeline, who seems so real as to be almost an historical personage. The little village is almost deserted now, but the church, a fairly modern structure at present used as a museum of Acadian relics, and the surrounding area, are maintained as a national institution and attract many visitors.

The $1.00 olive green stamp is the outstanding item of this series. It depicts Mount Edith Cavell, in the Canadian Rockies, near Resplendent, British Columbia, which was named after the heroic Englishwoman who was executed by the German military authorities on the 13th October, 1915, for activities which had exposed her to the extreme penalty. The noble mountain, over eleven thousand feet high, forms a dignified subject which has been well rendered by the engraver.

The Imperial Economic Conference of 1932 at Ottawa was commemorated by a series of four stamps, only one of which was pictorial in nature. The 13-cents green stamp of this series, issued on 12th July, is perhaps the least happy in conception and execution of our pictorial stamps. It depicts a symbolic female figure gazing into the distance (or is it the future?) with hemispheres on which the British possessions are shown in dark green.

The deliberations of the world's executive of the International Postal Union at Ottawa in May, 1933, called into existence a very beautiful stamp which shows Parliament Hill in Ottawa from an unusual angle, revealing the wooded cliffs from the Ottawa River,—an admirable view which will be unfamiliar to many who have not visited Ottawa. In addition to the main buildings of the parliamentary group the new Confederation Building is shown at the right. This stamp was described by the foremost philatelic journal of Great Britain as "a masterpiece of engraving and balance in design". It is the work of the British American Bank Note Company, of Ottawa, and was issued on 18th May, 1933.

On the 17th August, 1933, a commemoration of great Canadian interest occurred, when the One Hundredth Anniversary of the epoch-making transatlantic voyage of the Canadian steamship "Royal William" was celebrated. A full account of that remarkable vessel and her achievements, by Colonel William Wood, will be found in the issue of this Journal for August, 1933. The stamp worthily represents the staunch little ship of which Canadians have so much reason to feel proud. Again the maritime achievements of the Canadian people were brought to world-wide notice by a postage stamp.

Dominion Day of 1934 saw the issue of a large commemorative 3-cents stamp, blue in colour, commemorating the four hundredth anniversary of Jacques Cartier's first landing on Canadian soil in 1634. A world consensus of philatelists awarded this stamp first place among the postage stamp designs of the year 1934. The great navigator is shown on the deck of his little ship, directing the first landfall on the shores of New France.

On the same date a 10-cents olive green stamp was issued in commemoration of the sesquicentennial of the settlement in Canada of the United Empire Loyalists in 1776-1784. This finely engraved stamp shows a spirited group of Loyalists, father, mother and two children, taken from the well-known statue in Princess Square, Hamilton, Ontario. It was awarded fourth place in the competition referred to in the preceding paragraph, so that in 1934, out of a possible twelve awards, Canada secured first and fourth place. Both these stamps were the work of the British American Bank Note Company, of Ottawa.

The 2-cents brown-red New Brunswick commemorative stamp of 1934, issued on 1st July of that year, struck a localized note which was new to Canadian postage stamp issues. Doubtless the good people of New Brunswick were gratified, but if all the provinces were to claim the same privilege, the stamp collectors would have good reason to complain of exploitation. Any fear that the postage stamp issues of Canada were to be unnecessarily multiplied has disappeared, however, for this is the last purely commemorative issue so far put out by the Post Office Department of Canada, with the exception of the King George V. Silver Jubilee issue of 4th May, 1935, in which Canada naturally joined with the rest of the Empire in thus honouring her beloved monarch, himself a keen philatelist, on the twenty-fifth anniversary of his accession to the Throne.

The "Silver Jubilee" stamps aimed at no distinctively Canadian note, and need not be described in detail here. It should be noted, however, in passing, that with the exception of the rather overcrowded 3-cents design they were generally regarded as artistically the most successful of all

The "Royal Yacht Britannia" stamp of the King George V Silver Jubilee series of 1935.

"Air Mail" stamp, of the 1935 issue, pronounced by world authorities at a recent international exhibition to be one of the most beautiful of the twentieth century. The background portrays the Strait of Georgia, as seen from Oak Bay, near Victoria, B.C.

the Jubilee stamps; that they included the most popular stamp of all, a portrait of H. R. H. Princess Elizabeth on the 1-cent green; a vignette of Windsor Castle on the 10-cents green stamp, which in the opinion of philatelists considerably exceeded in beauty and perfection of execution the engraving of the same subject made in England for postage stamps of the various colonies; and the stamp which is said to have given the most pleasure to His Late Majesty—the 13-cents blue design with a delightful engraving of the Royal Yacht "Britannia". These fine stamps were produced by the Canadian Bank Note Company, of Ottawa, and issued on 4th May.

A change of contract in 1935, whereby the manufacture of Canadian postage stamps passed back into the hands of the Canadian Bank Note Company necessitated the issue, on June 1st, of a new King's Head and pictorial series. Of the latter, five denominations were issued, and these show no falling off in design or craftsmanship from the famous set of 1928.

The 10-cents rose stamp shows a Royal Canadian Mounted Police constable on horseback, with the wide prairie around him; and the skilled hand of the master-engraver has conveyed with remarkable fidelity, through the medium of a few engraved lines, the effect of vastness and hazy distances on our great western plains. This stamp, it is scarcely necessary to add, has been very popular with both stamp collectors and the general public, for whom the "R.C.M.P." stands as a personification of British Justice, both protective and relentless.

The subjects in this series range from Coast to Coast. The 13-cents purple stamp shows a group of delegates to the preliminary Conference on Confederation held at Charlottetown in 1864. The subject is a difficult one, and it has been handled with great skill. Tiny dots indicate facial expressions and features with extraordinary variety and character in this cleverly engraved stamp.

The 20-cents design, in olive green, shows Niagara Falls, with the Canadian Horseshoe Falls as the centre of interest. The engraver has festooned the stamp with graceful maple leaves and shows the mist hanging in front of the Falls in realistic manner.

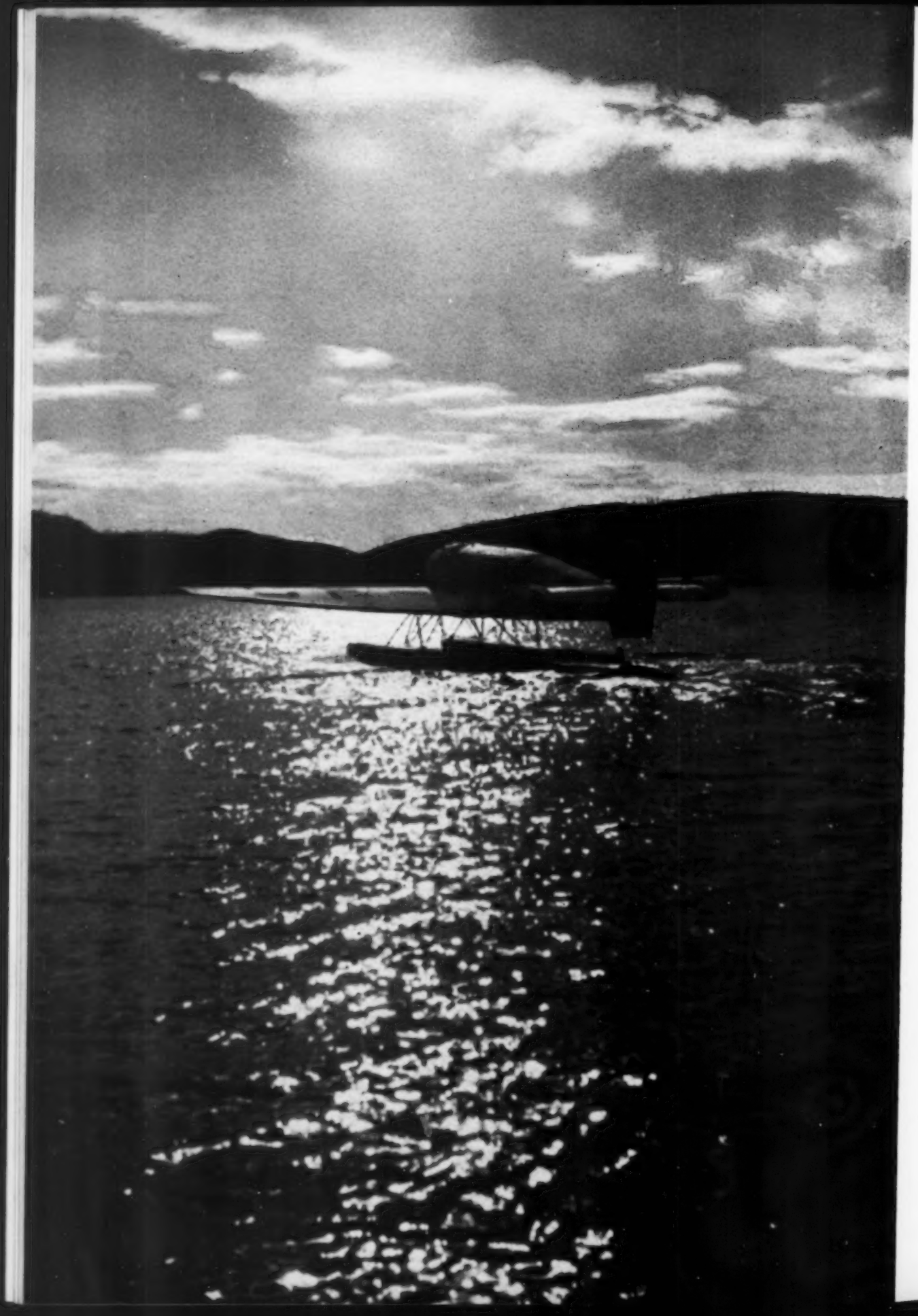
The charming Legislative Buildings at Victoria are shown in the 50-cents violet stamp. This well-known view gives Vancouver Island its first representation in Federal postage stamp issues, as well as honouring, through its capital city, Canada's Pacific Province.

The beautiful $1.00 blue stamp of this series completes to date Canada's pictorial postage stamp issues, and strikes a true geographical note. The fine statue of Samuel de Champlain on Dufferin Terrace in Quebec is shown in the foreground, with the St. Lawrence River and a shipping scene in the background. The mighty explorer, whose achievements meant so much in the opening up of the New World, had been honoured before in Canadian philately, but is worthy of a fresh appearance in this way.

The 6-cents brown air mail stamp of the 1935 issue is an exceedingly beautiful work of art which has been much admired by philatelic critics. At a recent international exhibition it was pronounced by world authorities to be one of the most beautiful stamps of the Twentieth Century. The subject is classical, and its treatment shows that Canadian postage stamps can achieve distinction in the realm of abstract art. Yet even here the Canadian geographical note has not been forgotten. Against a background of sea and mountains the mythical figure of Daedalus is shown in flight. This background will be familiar to those who know Vancouver Island, for it shows the lovely view across the Strait of Georgia from Oak Bay, near Victoria.

Geography, particularly in its industrial aspects, has been the inspiration for many Canadian pictorial postage stamp designs. It seems likely to remain so. This article is not intended as a lesson in geography, but merely to indicate something of the geographical and historical interest and profit that can be derived from a study of Canadian postage stamp designs.

Careful thought and a great deal of time are given to the selection and preparation of these tiny works of art, and much skill and artistry enter into their execution. If the reader will devote a hundredth part of this thought and time to the consideration of these stamps and of their reflections on Canadian geography and history, his interest in these subjects will be vastly stimulated and I can promise him that he will be well repaid.



MODERN PIONEERING IN CANADA'S WESTERN SUB-ARCTIC

by **RICHARD FINNIE**

IT is popularly supposed that the day of pioneering is over—pioneering, that is, in its most romantic sense—, that it passed with the covered wagon and the opening up of the West. But pioneering is still going on to-day just as romantically as ever before. The spirit of the pioneers themselves remains the same; it is only the methods that have changed. The covered wagon has been replaced by the aeroplane, the tractor and the power-boat, and the gold-pan of Old California and of the Klondike has been superseded by the diamond drill.

And this modern pioneering is going on apace in Canada, notably in a section a third as large as the entire Dominion, stretching from the 60th parallel of latitude to the North Pole itself.

It is also popularly supposed that this north country, officially designated the Northwest Territories, is a barren waste perpetually covered with snow and ice. Actually for at least several months annually, most of the land, just as close to the Pole as it reaches, is covered with neither snow nor ice but luxurious vegetation, and the weather is warm and pleasant.

Here was recently enacted a remarkable drama of modern pioneering which I had the good fortune to witness. The accompanying map traces our course northward from Edmonton, Alberta, down the Mackenzie River system, one of the greatest on the continent, turning up a tributary to Great Bear Lake.

Edmonton, with a population of 80,000, is the most northerly city in Canada; and it is a jumping-off place for traders, trappers, Royal Canadian Mounted Policemen, missionaries, prospectors, mining engineers—nearly everyone who has occasion to venture into the Western sub-Arctic or beyond.

Twenty-five miles from the city is South Cooking Lake, where aeroplanes flying to and from the North take off and land. But we ourselves prefer to cover the first lap of the journey by train, for the sake of the local colour to be absorbed en route. From Edmonton a weekly round trip is made by the second most northerly train on the continent having a direct main-line connection. It runs to Waterways, Alberta, 300 miles north.

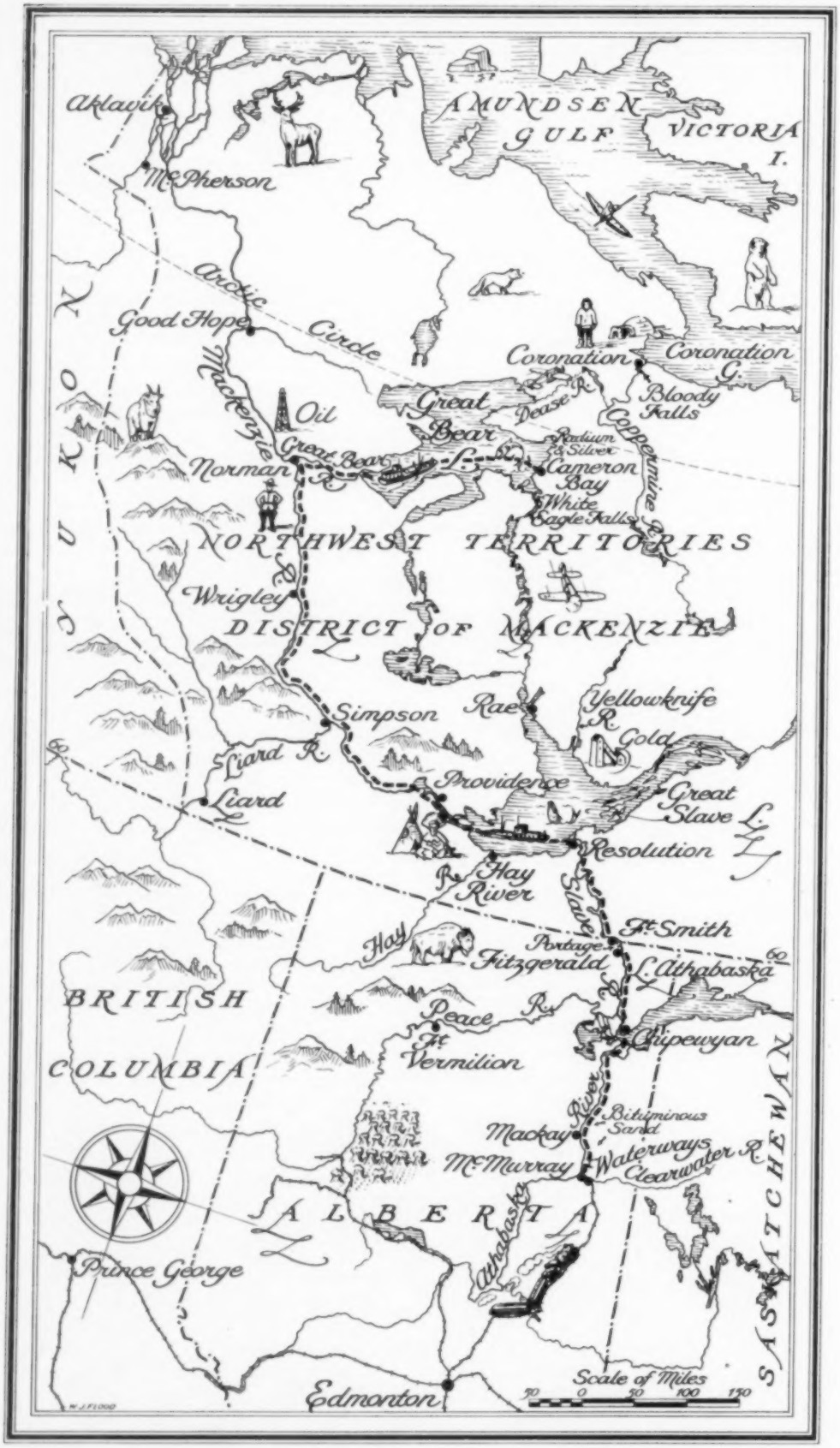
Strangely enough, though Waterways is the "end of steel", the center of population for the immediate vicinity is hardly Waterways at all, but rather the village of Fort McMurray. Why the railway was not continued the additional three miles few people really know, but some facetiously suggest that it was to give business to the several taxi companies operating between the two points.

In the heart of vast tar-sand beds, Fort McMurray exudes some of the atmosphere of an old-time frontier town. Up and down its main street, in and out of its post-office, stores, hotel and beer tavern, famous aviators and wealthy mining men rub shoulders with lowly trappers, labourers and half-breeds.

We board the Northland Echo, which plies between Waterways and the settlement of Fort Fitzgerald, nearly 300 miles still farther north. In a leisurely manner, her paddles flashing in the warm sun, this steamer of the Hudson's Bay Company sails down the Athabaska River, pausing to refuel at convenient wood-piles, enters Lake Athabasca where gold strikes have lately been made, then out of Athabasca and down the Slave River to Fort Fitzgerald.

Here navigation in the Slave River is interrupted by a series of treacherous rapids, one section of which is aptly known as the Rapids of the Drowned. Formerly, intrepid pioneers shot these rapids in small scows and there were not a few casualties. But there has not been a scow or a canoe through the rapids for a decade, all freight and passengers since being taken over a portage road which runs from Fort Fitzgerald sixteen miles to the foot of the rapids at the village of Fort Smith. This is the only break in river navigation from the end of steel to the Arctic Ocean.

Canadian Airways, Junkers Monoplane at White Eagle.


Aklavik
McPherson
Arctic Circle
Good Hope
Mackenzie R.
Oil
Great Bear L.
Great Bear R.
Norman
Wrigley
Simpson
Liard R.
Liard
Providence
Hay River
Hay R.
Fitzgerald
Peace R.
Ft. Vermilion
Peace River
Mackay L.
Bituminous Sand
McMurray
Waterways
Clearwater R.
Athabaska R.
Prince George
Edmonton
Slave R.
Ft. Smith
Portage
L. Athabaska
Chipewyan
Resolution
Great Slave L.
Yellowknife R.
Gold
Rae
Coronation G.
Coronation R.
Bloody Falls
Coppermine R.
Radium & Silver
Cameron Bay
White Eagle Falls
Pease R.
AMUNDSEN GULF
VICTORIA I.
YUKON
NORTHWEST TERRITORIES
DISTRICT OF MACKENZIE
BRITISH COLUMBIA
ALBERTA
SASKATCHEWAN
Scale of Miles
70 0 50 100 150
W. J. FLOOD

Ignorance of the real nature of the Canadian North is almost as widespread in Canada as it is elsewhere; and school geographies still convey the impression that it is an ice-locked wilderness. Thus it was that while many Canadians had heard of hyperborean Great Bear Lake as a storehouse of fabulous mineral wealth, most of them, if they had read enough about the matter to hazard an opinion, would exclaim: "Oh, supposing there is mineral wealth around Great Bear Lake, it's too remote and inaccessible. Great Bear Lake is a thousand miles or more north of Edmonton and you can't get supplies into the country nor the minerals out—except perhaps by air and that's too expensive." They knew nothing of northern waterways and their navigability.

With increasing activity in the Great Bear Lake area resulting from sensational discoveries of silver, radium and other worth-while ores, a severe lack of adequate transportation facilities was felt, transportation presenting no insurmountable barrier to experienced men. The few boats already in service could not begin to cope with the demands made upon them. For this reason, therefore, two organizations, the historic Hudson's Bay Company and the newly formed Northern Transportation Company, each quietly planned a whole fleet of vessels especially for transportation in and out of Great Bear Lake. Work was commenced early in the summer of 1934.

Several of these vessels were built near Fort McMurray, and one of them was already at Fort Fitzgerald upon our arrival on June 22. It had come under its own power down the Athabasca and Slave Rivers and was now being pulled out of the water preparatory to its being hauled over the portage road. It was a sternwheeler, 72 feet in length, weighing 11 tons, and it would constitute the largest, heaviest, bulkiest load ever brought over the portage road in the summertime. (An 85-ton vessel, the Margaret A, intended to reprovision fur-trading posts on the Arctic Coast had been successfully moved during the winter when the ground was frozen). Steel cables attached to winches mounted on motor trucks were dragging the sternwheeler up heavy timbers.

The portage penetrates through deep, spongy muskeg and bush, the nearest gravel pit is 300 miles south, so the entire roadbed consists of corduroy and earth. Parts of it must be rebuilt every spring and after every heavy summer rain. The road has evolved from an old Indian trail that early pioneers widened to permit passage of ox-teams dragging Red River carts. Horses came later (some still remain), and about fifteen years ago the first automobile; but to-day the tractor is king, rumbling through sand and mud regardless of weather.

When tractor and sternwheeler were but a mile and a half from Fort Smith we paused to examine a monument by the roadside, half-hidden amid wild roses. It marked the boundary line between the Province of Alberta and the Northwest Territories.

The sternwheeler, like an enormous float in a parade, came triumphantly into Fort Smith, gateway to the Northwest Territories. The local Indians looked on rather apathetically. They themselves seldom take part in work of this kind.

At the village of Fort Smith, on the 60th parallel of latitude, almost 600 miles north of Edmonton, was an impressive spectacle. On the crest of a hundred-foot embankment overlooking the river was a shipyard, where seven great ark-like barges were in course of construction. Some of them, with super-structures, twin Diesel engines of 100 horsepower each and tunnelled propellers, were power-boats capable of carrying 175 tons of freight apiece. The others were simply freight barges, with a capacity of 225 tons apiece, to be pushed by the power-boats. They were all similarly proportioned, about ninety feet in length and weighing a minimum of 50 tons each.

More than a hundred men were toiling to bring them to completion. The clatter of their hammers and saws and drills nearly drowned out the thumping of tom-toms in adjacent tents as the Indians strove to ignore civilization's intrusion for awhile by performing their ancestral gambling dance.

The contractors building these seven vessels for the Hudson's Bay Company and the Northern Transportation Company, respectively, had agreed to have all of them ready to go into the water by the first of July. It was a pioneering enterprise, however, and all sorts of unforeseen difficulties arose, with the result that the first of the vessels to be completed was not started on its way down the hill towards the Slave River until July tenth.

This constituted a critical situation. In the Far North the season for water navigation is comparatively short; freeze-up forces its cessation around the end of September or early October, especially in the higher latitudes. A great deal of work lay before all of the boats.

It was a freight barge that was the first to go into the water and no time was lost in loading it. First of all, heavy mining machinery went aboard, some of it, in crates, weighing as much as four tons.

While nearly all of the boats were designed to serve Great Bear Lake and its environs, they would not all actually proceed to the lake; working in relays about half of them would remain on the Slave and Mackenzie Rivers. This one, called the Northern Prospector, was to go all the way to the lake. I resolved to go with it.

It was not until later that I learned the nature of the bulk of the cargo: dynamite, fifty tons of it. At first the men handled it rather gingerly, but familiarity breeds contempt and in a short while they were tossing it about in a carefree manner. One of them commented, "After all, this stuff isn't really dangerous . . . so long as it doesn't explode."

Since the barge's tug was not yet ready, the motive power for the initial stage of the northward journey would be provided by a five-ton motor-schooner. As the Northern Prospector moved away from shore, another vessel groaned down hill on rollers towards the river, and still another was nearing completion on the bank. Flying a red flag of warning, the dynamite-laden barge started off.

We slipped easily downstream—down north—until, in the Slave River delta, the water became shallow and soundings had to be taken. Soon we were almost out of sight of land altogether, Great Slave Lake being the fifth largest on the continent.

Around the northerly reaches of this lake, in the Yellowknife area, gold discoveries have been made in recent years.

Continuing in a westerly direction we soon entered the Mackenzie River. The red flag hung limp at the masthead and we drifted lazily down the river while the temperature at times hovered around eighty degrees in the shade. The atmosphere was almost semi-tropical rather than sub-Arctic, but we were really in the sub-Arctic now. We even took sun-baths on deck.

It was of such country that Robert W. Service, the Yukon bard, wrote, "There's a land where the mountains are nameless and the rivers all run God knows where." But since Service's time most of the mountains have been named, most of the rivers have been charted from source to mouth, and due to miracles of modern pioneering much of the land has been accurately mapped from ground and air.

A good deal of wild life was observed, particularly ducks, which skimmed away from our prow over the mirror-smooth water. Millions of waterfowl breed in the Arctic and sub-Arctic. Moose, caribou, bears, wolves, foxes, wolverines, lynx, martins and weasels lurked somewhere in the timber; beavers and muskrats occasionally appeared swimming near shore. As a game conservation measure, hunting and trapping licenses, unless for scientific purposes, are issued in the Northwest Territories only to people who have established four-years' residence.

But the type of wild life with which we were most immediately in contact was the pernicious bulldog fly whose billions, along with the mosquitoes, make life miserable for man and beast during the sub-Arctic summer. It was only in midstream where the river was a mile or two in width that we found relief.

Most of the larger vessels plying the Mackenzie carry Indian or half-breed pilots who seem possessed of an uncanny faculty for reading water: they follow the channels and avoid the ever-shifting sandbars. However, the Mackenzie is perfectly navigable from source to mouth if care is exercised.

There was but one outstanding adventure to break the journey's placidity. One night in a fierce rain and windstorm the barge broke loose from the motor-schooner, careering crazily downstream in the swift current, two heavy anchors dragging helplessly. It was brought under control after drifting twelve miles. One of the men thought himself between Scylla and Charybdis. At the outset he was aboard the schooner, but when it came alongside he sprang to the barge, fearing that the schooner would be swamped; but soon he clamoured to return to the schooner, fearing that the barge might strike something and explode.

After a few days we came to one of the oldest settlements along the Mackenzie River, Fort Norman, founded early in the nineteenth century. Besides a few Indians, the permanent or semi-permanent popula-

tion consists of a score or so of white men and women: traders, trappers, mounted policemen, missionaries, and government wireless operators. Their respective dwellings and places of business are adjoined by flourishing vegetable gardens. A team of horses, another of mules, graze on the hillside—happening to be the only ones currently within a 400-mile radius. Tethered dogs howl. This settlement is much like a half-dozen others scattered along the river between Great Slave Lake and the Arctic Ocean. It is here that the Great Bear River, flowing out of Great Bear Lake, empties into the Mackenzie.

Fort Norman would be our base for a week or two. Another of the vessels to have been completed soon joined us, this one the Great Bear, a power-boat that was to push our barge up the Great Bear River.

On the fourth of August final preparations were made for the continuance of our trek. The Great Bear River, the lake's only outlet, is ninety miles long, swift flowing, it is halved by six miles of rapids, and the average depth of the river is hardly more than five or six feet. Any vessels which are to navigate it, therefore, must be of shallow draft, drawing preferably not more than two feet of water when loaded. Much of the Northern Prospector's cargo was transferred to smaller boats which would have little difficulty in bringing it to the rapids.

In the afternoon the barge, pushed by its new power-boat, moved away from its berth at the north side of the mouth of the Great Bear. Simultaneously we descried two other similar craft starting upstream from the opposite bank. These belonged to the Hudson's Bay Company, whereas those on which I was travelling as an independent observer belonged to the Northern Transportation Company. Rival organizations!

But this added zest to the occasion. An informal race ensued. It was feared by our crew that if the Hudson's Bay Company's boats reached the rapids before us they might become enmeshed and block the channel. The race was temporarily suspended, however, when the rival boats drew up to the bank for engine adjustments.

We chugged up the river, not daring to stop for even the brief period of sub-Arctic summer semi-darkness at midnight lest we be overtaken. Good progress was made for thirty-five miles until we neared the rapids. Then we got into shallow water. So shallow indeed did it become that shortly we found ourselves grounded.

It was the contractors who had built these new boats who were indirectly and unwittingly responsible for our plight. If we had reached this place at least two weeks earlier in all probability there would have been no trouble. As it was, the spring flood had subsided and the water was now at a low ebb.

At once a pilot boat struggled upstream to secure aid at a camp which had been established to prepare for our coming. Soon a couple of small scows, driven by gasoline engines and fitted with spools of steel cable, drew alongside the Northern Prospector. A cable was stretched out to one bank of the river, about three hundred yards in width here, and fixed to a "dead man"—rocks and fallen or standing trees strong enough to withstand a terrific strain. Then the cable was passed several times around a capstan on our prow. The winch began to rumble, the cable tightened and the vessels were dragged over the gravel. Meanwhile the slack cable from the capstan was wound back onto its spool in one of the scows. The Northern Prospector and the Great Bear, again afloat, moved up under their own power to the camp.

The sub-rapids camp was divided into two distinct sections, that of the Northern Transportation Company and that of the Hudson's Bay Company. There were fifteen tents and twice as many men. Freshly cut spruce logs formed a wharf to which our barge and power-boat were moored. Near-by was the sternwheeler, safely arrived from Fort Smith and now ready to carry freight up and down stream, even through the rapids if necessary. To be used experimentally, it was the only sternwheeler in the flotilla.

Here was sub-Arctic transportation history in the making. Never before had vessels so large as the Northern Prospector and the Great Bear been brought up the Great Bear River. They were not intended to run freely up and down the shallow, turbulent stream with freight; their work lay on Great Bear Lake and it was up to the crew to get them there. Small motor-scows would handle the freight on the Great Bear River.

Once again we started off, this time with the aid of three-quarter-inch steel cable. Barge and power-boat would creep forward a few hundred feet, then the cable

Sub-Arctic Shipyard, Fort Smith, on the 60th parallel. Power and non-power barges, 50 to 60 tons in weight, being constructed for freighting in and out of Great Bear Lake, 1500 miles northward by water.

would be released from its dead man and attached to another farther up stream. Progress was painfully slow, a foot or two at a time. The first day we did rather well —about a half-mile. The next day we didn't get quite so far, and we began to hope that soon we would round a bend, at least, so as not to be obliged to look at the camp any more. We were now well into the rapids.

Here and there on each side of the stream were great masses of ice which had not yet surrendered to the August sun.

The vessels were beleaguered by massive boulders, some of which pressed a little too hard against the planking, opening up seams and necessitating continuous pumping for hours and days on end. The damage was at no time really serious, however, and the leaks were always patched up.

After ten days of back-breaking toil we came to a section of the rapids where the channel was so narrow and so tortuous that it would have been awkward to get both big boats through hooked together as they were. The Northern Prospector, ahead, was momentarily grounded. With a cable drawn from shore, the Great Bear was allowed to slip back in hope of manoeuvering it through by itself. But neither the Diesel engines nor the winch were strong enough to hold the vessel up against the current, which was flowing at a ten-mile-an-hour rate, the result being that it slipped inexorably onto a flat ledge and stayed there.

It was disheartening after all these days of conscientious labour to be rendered suddenly helpless, but the situation became almost intolerable when there appeared from around a bend the argosies of the Hudson's Bay Company. Proceeding ever so cautiously, putting out not one but two cables at a time, one made fast to either bank, they drew alongside our stranded craft. Then, profitting by our errors, they passed us, rather disdainfully, we thought, and crawled towards the last lap of the rapids. They seemed in a very favourable position. A couple of days later one of their supporting cables snapped and they were hurtled onto a ledge just as our boats had been.

I felt sure that eventually all of the boats would attain their destination. But I could afford to spend no more time with them. The season was already well advanced and I had yet much territory to cover. I wanted to visit the mines of Great Bear Lake.

And so, abandoning my plan of accompanying the boats to the lake, I went back to Fort Norman in one of the small scows to await an aeroplane.

There was little likelihood that a plane would have reason to come to Fort Norman for some time, so in the interim I went downstream—down the Mackenzie River—fifty-two miles, arriving at a most interesting spot. It was here that in 1921 the discovery of oil, of a reasonably good grade and in undetermined quantity, precipitated a stampede into the Mackenzie District. Scores of men by dog-team or boat, and some by plane, sped to the magic area to stake claims. Small fortunes were gained and lost. To-day there is only one company actively engaged in the production and refining of oil here, and according to a large sign, anachronistic in the wilderness, you may buy fuel oil for thirty-two cents a gallon and gasoline for sixty-four cents. The price may seem a bit high, but so is the latitude. Only 175 miles from the Arctic Circle, this is the most northerly oil well and refinery in the world. Imported gasoline formerly sold at Fort Norman for three dollars a gallon. Enough oil and gasoline can be produced at the Discovery Well, as it is called, currently to supply the entire Mackenzie River District including Great Bear Lake, where nearly everybody needs such fuel. Even the Indians have outboard motors for their canoes, and the Eskimos of the Mackenzie delta operate gasoline schooners.

Returning to Fort Norman I saw a plane circle about the confluence of the Mackenzie and Great Bear and land. It was a big all-metal monoplane belonging to the Canadian Airways Company and its pilot chanced to be one who had flown me over the North Magnetic Pole in 1930 on a search for relics and data pertaining to the Sir John Franklin expedition, more than a hundred of whose members were swallowed up in the polar fastnesses more than a century ago.

We took off at nine o'clock of a misty morning, August 20th, and headed up the Great Bear. In a few minutes we were over the sub-rapids camp. I looked ahead eagerly for signs of the vessels I had left in distress a few days earlier. They had ingeniously worked themselves back into the channel with the help of pontoons, the pontoons being scows which had been

brought alongside, sunk, securely lashed, then pumped out. The Hudson's Bay Company's vessels hadn't moved yet; they were awaiting a fresh supply of cable.

Flying ninety miles, the length of the river, we came down at its head to inspect a cache of freight deposited by the small boats. It contained 200 tons, but there was a lot more to come; 2,400 tons in all. It would then have to be carried across Great Bear Lake, 200 miles to the mining camps at the eastern end. Freeze-up would be imminent in six weeks. Could the job be done?

Great Bear Lake, the fourth largest on the continent, is the largest entirely in Canada, its area being almost 12,000 square miles, and it has the longest shoreline of any fresh water lake in the world. It has a number of good harbours, particularly around its southern shores, and is adequately deep for lake boats. It is bisected by the Arctic Circle.

An hour and a half of flying brought us to the southeastern extremity of the lake. Pausing long enough only to refuel, we struck towards the barrens. An errand was to be done on the Arctic Coast. Appropriately enough, as the Arctic Circle was crossed, we flew through a blinding snowstorm. The tree line was soon left behind. We were now right over the so-called barren lands, which might more accurately be termed the Arctic prairies. While trees grow only in the river valleys in this section, disappearing altogether near the coast, there is no dearth of vegetation. Many types of grasses, mosses, lichens and shrubs grow in profusion, and more than 700 varieties of wildflowers.

Sighting the Coppermine River, which flows into the Arctic, we followed it down stream. Then we soared over Bloody Fall, where Trader Samuel Hearne in 1771 became the first white man ever to approach the Arctic Ocean by land. Tragedy stalked with him. The band of Indians who were his guides and canoemen fell upon and massacred a peaceful group of Eskimos fishing at the foot of the torrent.

We sped northward twelve miles until the Arctic Ocean opened out before us, or rather a division of it known as Coronation Gulf, midway between Hudson Bay and Alaska. Rounding the left bank of the river, we prepared to land at the trading station of Coppermine.

To me this was like a homecoming. I had made my headquarters here for a year in 1930-31, while living among and studying the Copper Eskimos. The Copper Eskimos were virtually stone-age people until twenty-five years ago when they were visited by the explorer Stefansson, who was the first white man that most of them had ever seen. Since his time other white men have come among these splendid little people—especially traders, trappers, mounted policemen and missionaries—and thus they have learned a good deal about white men and have adopted many of our ideas and customs, most of which have redounded to their detriment.

The purpose of our visit was to pick up a load of white fox pelts. There were about 25 bales, 100 pelts in each. This represented only a small fraction of the white and Eskimo trappers' winter catch along the coast. Other consignments would be sent south by plane or boat. Between fifty and sixty thousand fox pelts are exported from the Northwest Territories annually.

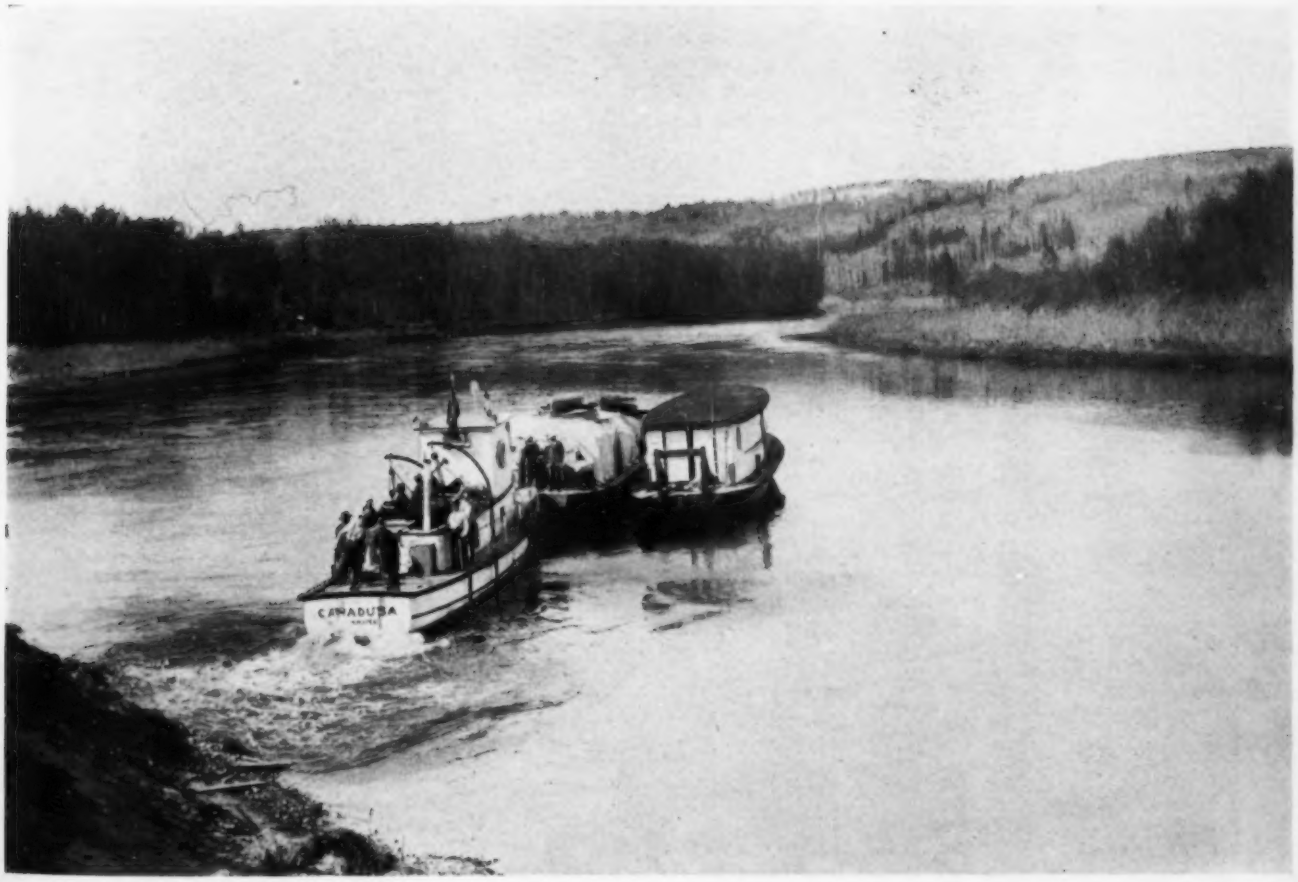
We could not afford to linger at Coppermine. The period of the midnight sun had passed, the days were shortening with the approach of autmun, and so, after only two and a half hours at the post, we took off and headed southward, racing against darkness.

Flying through another snowstorm, at dusk we reached our day's ultimate destination. This was Cameron Bay, at the southeastern part of Great Bear Lake, 175 miles from the Arctic Coast. It was the unofficial capital of the mining area in the neighborhood of which lived some two or three hundred white men, a few of them with their wives and families. While only a score or so actually had their cabins at Cameron Bay, the rest visited it frequently. It was a clearing station for mail, freight, and gossip.

I remained at Cameron Bay, my plane hastening southward with its precious cargo of furs.

Annihilating distances, sweeping over immeasurably vast forests and barrens, in fair weather and foul, in winter and in summer, the aeroplanes of the Canadian North perform miracles of modern pioneering with such regularity that they are accorded scant mention in the newspapers. Such a standard of skill and efficiency has been set that there is scarcely ever a mishap or a casualty, and without accidents how can reporters continue indefinitely to rhapsodize on the accomplishments of

Free-lance prospector crosses Great Bear Lake in tented homemade scow.



Hudson Bay Co's M.T. "Canadusa" leaving end of steel at Waterways with load of freight for the far north, May 1928.

Fort Norman, showing confluence of Mackenzie and Great Bear Rivers (Great Bear comes in from left).

northern pilots? But to these intrepid men no small credit is due for the exploration and development of that vast hinterland, the Northwest Territories.

At the Cameron Bay sub-base of Canadian Airways the wireless operator and agent keeps in touch with the pilots of all planes coming from the north, south, east or west. Through other stations he gives them weather reports and sundry information (until lately none of the planes were radio-equipped). The first of numerous planes to land after my arrival was a veteran of many seasons in the North. It taxied to shore bearing a load of greenstuffs from the gardens of Fort McMurray. The pilot emerged, carefully carrying a crate of lettuce. Such delicacies can be and are—in limited quantities—grown around Cameron Bay, but the prospectors and others are usually too preoccupied for gardening. A number of strong silent men were soon seen strolling towards a local restaurant for a feed of lettuce.

For a time there was but one restaurant in Cameron Bay. Now there were two. Last winter an old prospector fell ill—mortally, it was thought and a fund was raised to send him to Edmonton and to pay his funeral expenses. He didn't choose to die, however, and after quaffing ale in the taverns of the city for several months, he used the residue of the collection to outfit himself and return to Cameron Bay to open a restaurant. Such is the indomitable spirit of the true Northerner.

The pilot who had brought the lettuce took off early next morning with passengers and a consignment of His Majesty's mail southward bound. The aeroplanes operating in the Northwest Territories transport an almost limitless variety of loads. They carry everything not only including the kitchen stove, but heavy mining machinery in sections, all manner of canned foodstuffs, live pigs and poultry, dynamite, gasoline. They are renowned as emergency ambulances. There seems to be no assignment too unusual or too hazardous for a northern pilot. He will carry a trapper or a prospector to any point marked on the map or not marked, call for him again at any specified time and fly him "outside" or to some other point in the wilderness Thanks to the aeroplane a prospector can cover a tremendous area during a brief season.

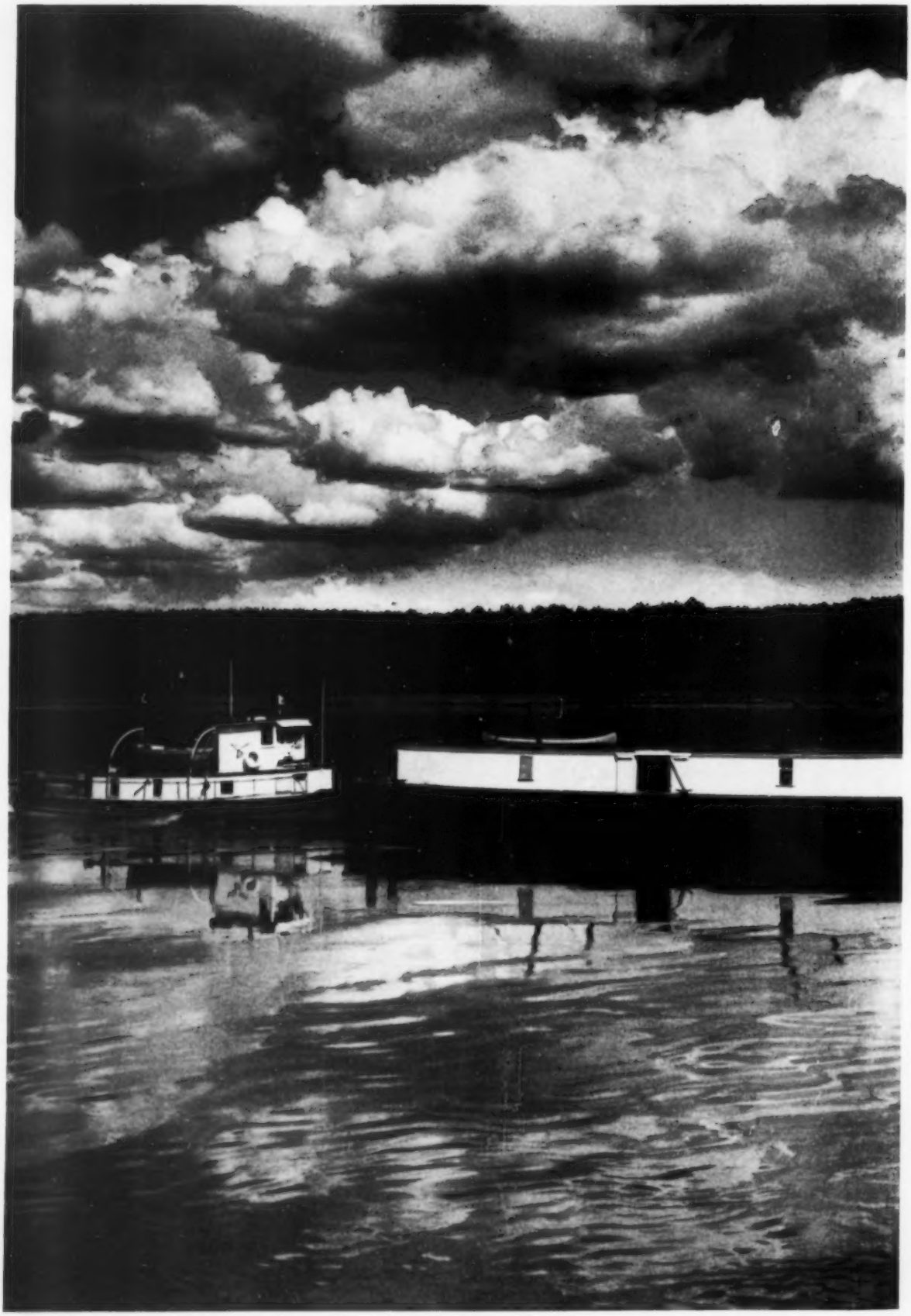
At the Cameron Bay barracks of the Royal Canadian Mounted Police visitors admire a fine team of husky dogs with which many patrols have been made in winter. Contrary to popular belief the husky, Eskimo or malamute dog is not an inherently vicious or untrustworthy animal. He will usually react according to the way he is treated.

In many districts in the North the dogs are fed fish almost exclusively if it is available, and thus the nets must constantly be kept in repair and set. Great Bear Lake, along with all of the other lakes and rivers of the country, teams with the kind of fish that sportsmen are supposed to dream about—including salmon trout weighing fifty pounds or more. Yet no one plays with rods and flies here, and trolls are used but sporadically. Where the livelihood of your dogs and perhaps of yourself as well may depend on fish, you must resort to a more certain method of catching it.

Some of the Indians, and some of the white men too, remove the fish from the nets with the aid of their teeth. The plan is to grip the head of the wriggling fish firmly between the teeth, thus leaving both hands free to extricate it from the mesh. It's all right if you're fond of fish.

Within a radius of a few miles of Cameron Bay there were about a half-dozen mining camps. Of these the most active and most interesting was just seven miles away. It was Eldorado, the first mine around Great Bear Lake and the first radium mine in Canada. In 1930 a prospector named Gilbert LaBine was flying over here when he noticed a peculiar black rock formation. Other prospectors had seen it and had passed it by; he had the advantage over them of having studied radium ore and he recognized this as such. He landed, staked claims. To-day there was an amazing sight at Eldorado—a fully equipped modern mine just a stone's throw from the Arctic Circle. In its concentrating mill was reduced to a convenient form for shipping the pitchblende and silver ore taken from three thousand feet of tunnels at various levels. The pitchblende was not only among the richest radium bearing ore yet discovered in the world, but it had a silver content high enough to merit its being mined for that alone.

Near the shore was a pile of bulging sacks. Each of them worth anywhere between five hundred and eight hundred dollars, there were twelve hundred of them,



Typical present-day freighting craft on the Mackenzie River system. The Mackenzie, like the Mississippi, has ever-shifting channels. The barge is, therefore, pushed, not towed, so that the attendant tug-boat may readily release it should it strike a hidden sand bar.

Power boat and freight barge fight their way up the rapids of the Great Bear River. White water in foreground indicates a menacing boulder. Small scow alongside freight barge contains spool onto which slack from supporting shore-cable is being wound.

totalling 70 tons in weight, awaiting shipment by boat to the end of steel at Waterways, whence they would be forwarded to Canada's radium refinery at Port Hope, Ontario. Hitherto most of the concentrates from the mine had been transported by plane in small lots; now they would go both by boat and plane. (Recently a large freighting plane was put into service expressly to bring out the concentrates during the winter and the in-between seasons when boats are useless, thus keeping the refinery constantly supplied).

The buildings at all of the camps were constructed of native timber. I mention this fact because of the widespread supposition that the whole of the Far North is treeless, or at best that the trees are stunted. Actually, trees 60 feet in height and 20 inches in diameter at the base are to be found within fifty miles of theArctic Coast along the Mackenzie River. All of the southern slopes of Great Bear Lake are well wooded, spruce predominating, although there are also birch, poplar and other trees. There are enormous pulpwood reserves as well as sufficient timber for all the buildings and boats ever needed in the Mackenzie District.

In a few days a small auxiliary vessel arrived at Cameron Bay from the head of the Great Bear River with emergency supplies of foodstuffs and a little gasoline. Its appearance caused no excitement; it could have made the traverse much earlier. While imported foods and luxuries were running low, the people were certainly not facing starvation; they could always fall back on the game and fish of the country. Salmon were plentiful, and thousands of caribou were known to be grazing within fifty miles of the settlement. Most of the people were chiefly concerned with the mining machinery and other equipment which could not be had until the large barges crossed the lake. And unless this came to pass the mines would soon have to close down and more than a hundred men, many of them labourers unversed in the lore of the North, would be thrown on their own resources.

Cameron Bay was rife with rumours. "Moccasin telegraph" reports were conflicting. Some said that the barges would be along in a day or two, others said that they would be held up indefinitely—indeed, it would be miraculous if they ever got through.

The last week in August I flew southward thirty-five miles to visit another camp. It was conveniently located near an impressive power site, White Eagle Falls, which, according to a resident engineer, were capable of supplying the entire mining area of Great Bear Lake with electrical energy totalling 22,000 horsepower.

Notwithstanding a general stortage of supplies the men at the White Eagle camp were carrying on as best they could with the materials at hand, philosophically biding their time until the boats should arrive. Some of the men were squaring timbers and making set-frames which would line and strengthen the mine shafts. These frames, like the camp buildings, were of native spruce.

On a hillside adjacent to the camp some interesting discoveries had been made within the past year or two. One vein measuring more than two feet across had assayed as much as two thousand ounces of silver to a ton of ore. But there had since been much more sensational strikes; one near Cameron Bay produced ore assaying four and five thousand ounces of pure silver to a ton.

But the men were labouring under very severe handicaps. They had run short of gasoline, and without gasoline they could not operate their diamond drills. They had run short of dynamite and fuel oil and tea and coffee and tobacco. They were eating a great deal of fish nowadays. They doggedly carried on, cleaning muck out of the mine and setting the stage against the time when they would be able to operate under normal conditions again.

Then, on the first of September, there was a wonderful sight. Heralded by a throbbing of engines attuned to a throbbing in men's hearts, came the Great Bear, the power-boat I had left stranded in the Great Bear River two weeks before. Triumphantly it approached the camp laden with 175 tons of food, dynamite, gasoline.

One might suppose that under such circumstances there would be cheering and speechmaking. But no; there was not time for such formalities. As soon as the Great Bear was unloaded she must scurry back across the lake to pick up another load and still another. The Northern Prospector barge, left at the head of the Great Bear River to be loaded, was forthwith to be hitched again to the power-boat for

subsequent trips. We heard that the Hudson's Bay Company's boats, coming second in the race, were now delivering freight at Cameron Bay. More than a half-dozen round trips would have to be made by the several boats if all of the 2,400 tons of freight were to be delivered to the various camps; and it transpired that every ounce of freight was safely disposed of before freeze-up, which came early in October

A succession of blasts echoed from the hillsides and fragments of silver-laden rock scattered skyward. The crisis was over. All of the mines could carry on throughout the winter.

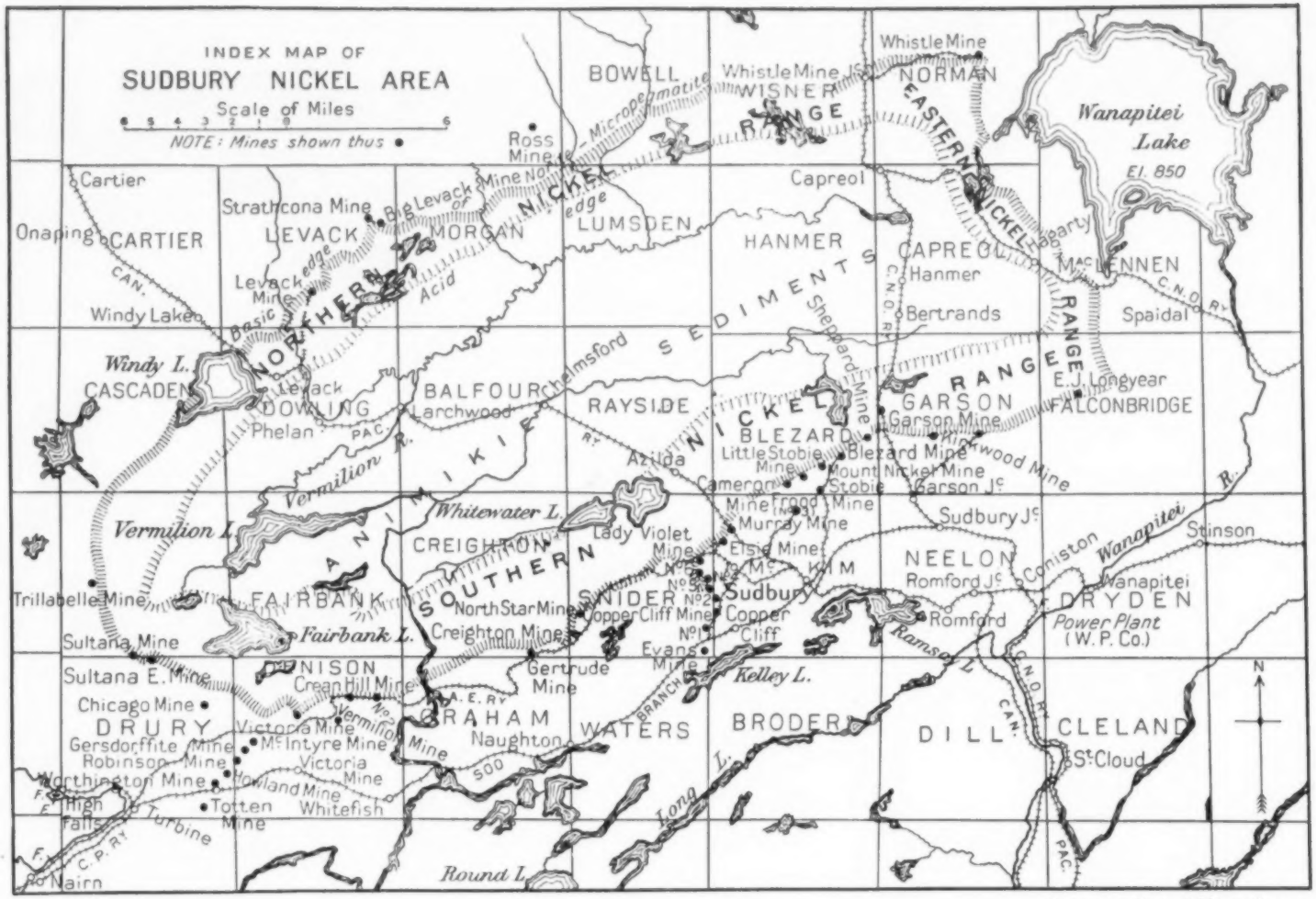
Had the vessels failed to get through, Great Bear Lake would have suffered a blow from which it would have taken at least several years to recover. But now the skeptics no longer could say, "There may be mineral wealth around Great Bear Lake but you can't get it out nor supplies in . . . " It had been demonstrated conclusively enough that transportation both by air and water was practicable.

The difficulties that the power-boats and barges had encountered in the rapids were essentially the difficulties of a pioneering enterprise; never before had vessels so large been brought up the Great Bear River, much less on to Great Bear Lake. Future vessels should be able to proceed more smoothly; the mistakes and experience of their predecessors should guide them. But now that the Great Bear and the others had reached the lake, there would in all probability be no need ever to take them elsewhere. They would remain on the lake year after year, ferrying freight back and forth from the head of the Great Bear River, while in the river itself smaller craft would relay it to the Mackenzie where other suitable, large vessels would carry it to and from Fort Smith and the end of steel. A fifteen-hundred mile water highway had been blazed to Great Bear Lake.

The building of the boats, the launching of them, the trek of them down the Mackenzie to the sub-Arctic; the flying to and fro of airplanes, the influx of prospectors, mining engineers, adventurers; all of this activity had revolved around the reputed mineral wealth of Great Bear Lake and its environs.

Here there are not only silver and radium, but oil, coal, timber, water power, gold, copper, lead, zinc and many other minerals of present or future economic importance. True, the extent of some of these minerals has not yet been proved. But the known facts, together with the immense natural resources of the Far North generally, lead me to suppose that in a few years there may be prospering towns and cities right across Canada's polar fringe.

White Eagle Falls, Camsell River.



By courtesy Dept. of Mines, Ontario

The Sudbury nickel-copper area, Ontario, showing the location of the Mines.

CANADA'S NICKEL INDUSTRY

by **E. A. COLLINS**

"OF making books there is no end," so said the Preacher and certainly there has been no dearth of descriptive articles and learned scientific treatises on the subject of nickel, particularly during the past fifteen years.

For readers of the Canadian Geographical Journal most of whom have access to the technical articles as required, it will probably prove of more interest if this article is confined to a short sketch with an historical background, and depicting in non-technical language the processes of manufacture, the varied uses and distribution of its products, and at the same time indicate the tremendous importance of the industry in the commercial and industrial life of Canada.

The first reported discovery of ore in the Sudbury District was made in the summer of 1853 by a Dominion Geological Survey party working in the vicinity of Creighton Mine. Thirty-one years later, during the construction of the main line of the Canadian Pacific Railway, ore was discovered in a rock cut a short distance west of Sudbury in the Township of McKim. Application to the Ontario Government for a patent covering Lot 11, Con. 5, Township of McKim, was made on February 25th, 1884, by Thomas Murray and his brother William Murray of Pembroke, and with these pioneers were associated John Loughrin of Pembroke and Henry Abbott of the town of Brockville. Patent was issued to these applicants on October 1st, 1884, and the property conveyed consisted of 310 acres described as mining lands under "The General Mining Act of 1869". The purchase price was Three Hundred and Ten dollars of lawful money of Canada.

This property afterward became the famous Murray Mine, developed first by the Vivians of Swansea, Wales, and later passing through several ownerships to the International Nickel Company of Canada, Limited.

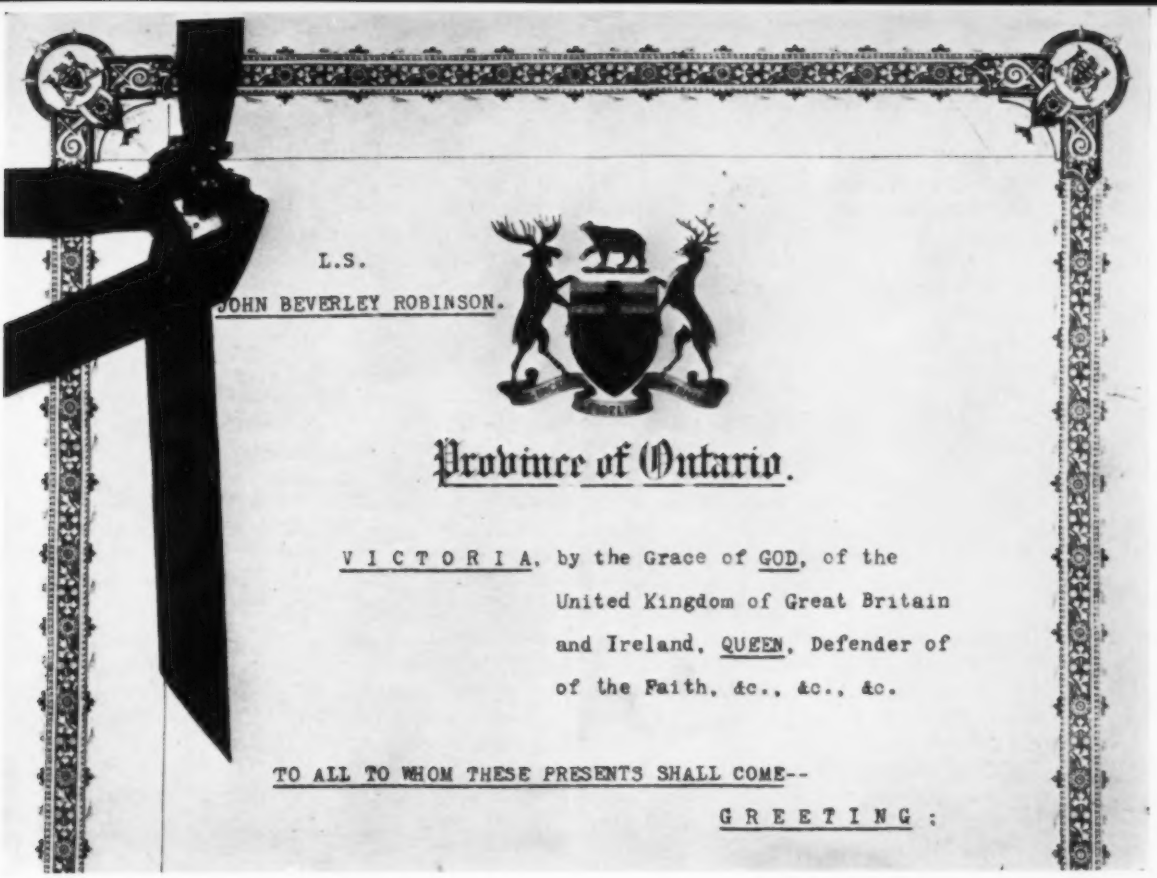
Following the discovery of ore as noted above in 1884, prospectors from all over the world rushed into the district, and for the succeeding six years an area about thirty miles square was explored and prospected in a very thorough manner. Their work was later correlated by Dr. A. P. Coleman in his geological report and map of the Sudbury Nickel Region published in 1905, a classic of its kind which has passed through several editions, and which is still in daily use throughout the mining world.

Among the more famous and successful of the early prospectors were Thomas Frood, James Stobie, Rinaldo McConnell, F. C. Crean, J. H. Metcalf, Thomas Baycroft, W. B. McAllister, Henry Ranger, F. Y. Eyre, William McVittie and Aeneas McCharles. The Work of these early prospectors was carried out in an exceedingly thorough manner, unaided as they were by any prior geological mapping or direction, with the exception of Dr. Logan's annual report for the year 1853. If one were inclined to be facetious, the remarks of a prominent Sudbury prospector still living, might be apropos. In offering certain mining claims for sale or development, he remarked to the prospective purchasers that the claims were virgin territory and possessed the virtue of never having been "engineered".

The townships of McKim, Blezard, Creighton, Snider, Denison, and Levack were carefully explored and several outcrops of nickel-copper sulphides were located. Outside capital was attracted to the district by press reports of these discoveries and what must have appeared in those days as very substantial sums were paid for claims, and several Companies were formed to develop the properties.

One of the very first in the field was Samuel J. Ritchie of Akron, Ohio. Ritchie was a man of the James J. Hill or Donald Smith type, aggressive, restless, pioneering and ever reaching out for new fields to conquer. On January 5th, 1886, Ritchie organized the Canadian Copper Company, becoming its first President with H. P. McIntosh of Cleveland, Ohio, Secretary-Treasurer, and this company acquired most of the then known deposits in the district. The history of The Canadian Copper Company and its successor, The International Nickel Company of Canada

Members of the Officials of the International Nickel Company of Canada Limited and original Prospectors of the District.



L.S.

JOHN BEVERLEY ROBINSON.

Province of Ontario.

VICTORIA, by the Grace of GOD, of the United Kingdom of Great Britain and Ireland, QUEEN, Defender of of the Faith, &c., &c., &c.

TO ALL TO WHOM THESE PRESENTS SHALL COME--

GREETING:

WHEREAS,

THOMAS MURRAY and WILLIAM MURRAY of the Town of Pembroke in the County Renfrew Esquires, HENRY ABBOTT of the Town of Brockville in the County of Leeds Esquire and JOHN LOUGHRAN of the Village of Mattawan in the District of Nipissing Merchant have contracted and agreed for the absolute purchase of the lands and tenements hereinafter mentioned and described, as "Mining Lands," under "The General Mining Act of 1869," at and for the price and sum of Three hundred and ten Dollars of lawful money of Canada, and of which lands we are seized in right of Our Crown.

NOW KNOW YE, that in consideration of the said sum of Three hundred and Ten dollars, well and truly paid to Our use at or before the sealing of these Our Letters Patent, We have granted, sold, aliened, conveyed, and assured, and by these Presents do grant, sell, alien, convey, and assure unto the said Thomas Murray, William Murray, Henry Abbott and John

Reproduction of original patent from Ontario Government to Thomas Murray, William Murray, Henry Abbott, John Loughrin.

Limited, may be said to be the history of the nickel industry in Canada.

Early in the year 1886 mining operations were in progress on Lot 12, Concession 2, McKim, (Copper Cliff Mine) located in the centre of what is now the thriving town of Copper Cliff. Work was also started on Lot 5, Concession 1, Blezard, (Stobie Mine). Promising results were being obtained from surface exploration on various other properties owned by the Company and several occurrences were prospected in McKim and Snider townships, followed later by the development of the famous Creighton Mine located on the boundary between Creighton and Snider townships and the enormous deposit at Frood Mine located on lot 7, Concession 6, Township of McKim.

At the outset little or nothing was known about the nickel content. Ritchie reported that he had a mountain of copper ore in the Copper Cliff mine, and hand-picked shipments of high grade ore were made to various smelting plants in the United States, England, and the continent of Europe.

The chief purchaser, however, was the newly formed Orford Copper Company of Bayonne, New Jersey, headed by Col. Robert M. Thompson, who contracted to purchase 100,000 tons of copper ore.

In December 1886, Francis L. Sperry, chief chemist at Copper Cliff (and for whom the mineral sperrylite ($PtAs_2$) was named) found nearly four percent of nickel in a shipment of ore consigned to Bayonne. About the same time Col. Thompson's metallurgists reported that it was impossible to make pure blister copper from the Canadian ores.

This was the beginning of the study and research into the metallurgy of nickel and its alloys, which has been carried out unceasingly from that time to the present day and I believe one is safe in recording that the achievements of the research engineers and metallurgists in nickel, merit outstanding attention in the field of science.

It is obvious that within the limits of this short article it is impossible to describe, with any attempt at detail, the various processes through which the metals pass from the time they are removed in their natural state from the mine, to their refined forms, ready for the markets of the world.

The ore as mined is a copper-nickel sulphide with the percentage content of each metal varying in different deposits throughout the district and it is also found that the proportions of metal content vary in different levels and sections of the ore bodies. In addition to nickel and copper, the ore contains (also in varying content) what is known as the precious metal group, gold, silver, platinum, rhodium, iridium, and some selenium.

The ore from the mine is conveyed to the concentrator plant at Copper Cliff where it is crushed through Symons Cone Crushers and Rolls, to Rod Mills and then to a battery of flotation tanks where a rough but effective separation of the nickel and copper sulphides is made.

From the flotation tanks the two products follow different routes. The separated copper sulphides go direct to reverberatory furnaces where they are smelted with powdered coal, and some impurities slagged off. The molten sulphides, or matte, containing copper, sulphur, some iron and little nickel, are transferred in ladles from the reverberatories to copper converters. There the sulphur is burned off, and iron and nickel slagged off. The copper is now ready to be sent to the refinery, either as cast slabs or molten in the same manner as the Orford process copper.

The separated copper sulphides dealt with above are nearly pure, but a considerable part of the copper sulphide in the ore remains with the nickel sulphides so with them a more eleborate separation is required. They contain also some iron sulphide and some rock matter to be slagged off in the reverberatory furnace. From the flotation tanks these nickel sulphides go to the roasting furnaces where the sulphur content is reduced. The concentrates eventually find their way to the reverberatory furnaces to be reduced to a furnace matte using powdered coal as fuel.

This molten mass is ladled into a converter where more sulphur is burned off and the oxygen unites with the iron in the sulphide to form ferrous oxide. This latter is slagged off and what remains is ready for the Orford process of copper-nickel separation.

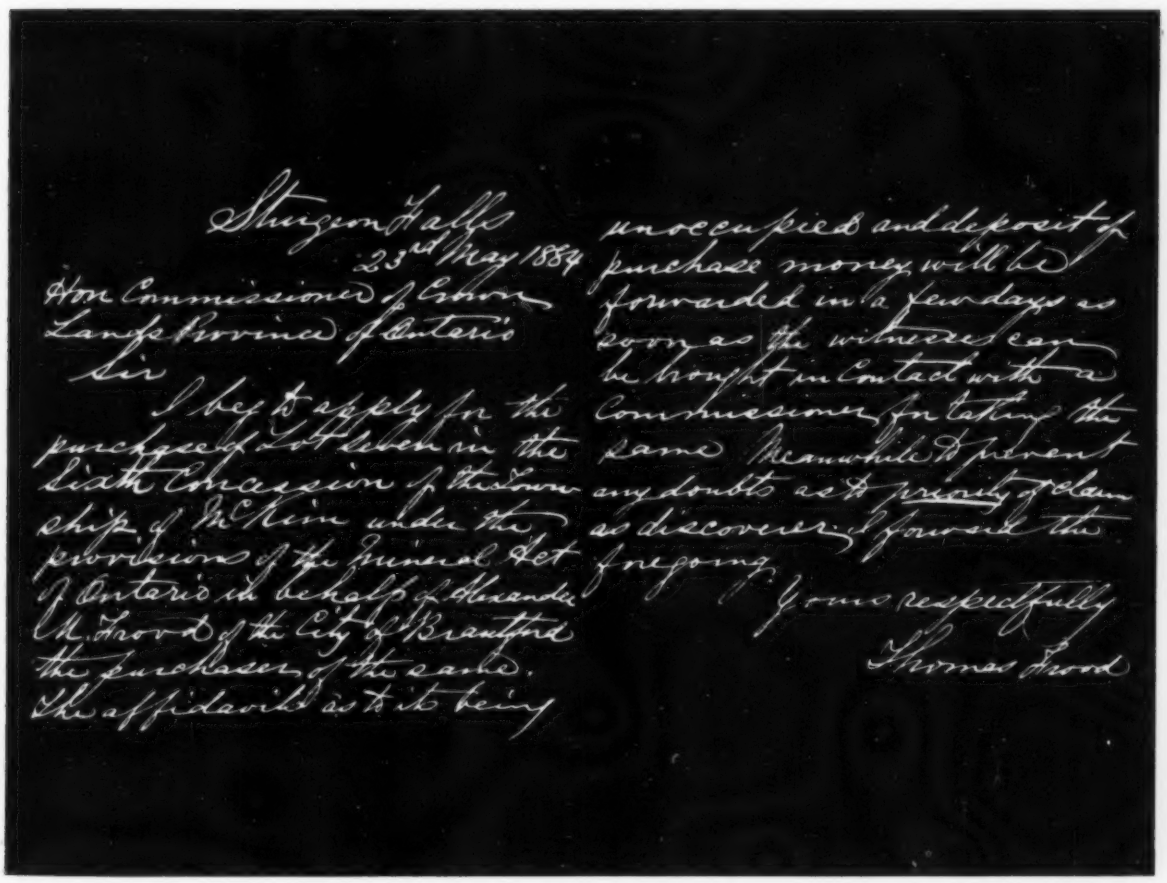
This process depends upon the chemical action of sodium sulphate on copper-nickel sulphide in the presence of carbon, the sodium turning to a sulphide and the

MINERAL PRODUCTION OF ONTARIO IN 1886.

Mineral.	Quantity.	Value.
		$
Arsenious Acid	35	1,500.00
Cement ..... bbls.	42,000	30,900.00
Copper Ore ..... lb.	2,860,760	286,076.00
Nickel Ore	1,200,040	2,689.00
Gold		13,200.00
Gypsum ..... tons	6,600	48,000.00
Iron Ore ..... "	16,000	30,000.00
Mica (partly uncut) ..... "	18	618,000.00
Petroleum, crude ..... bbls. of 35 Imp. gals.	600,000	44,050.00
Phosphate of Lime ..... tons.	3,350	189,974.00
Salt ..... "	56,632	226,410.00
Silver Ore ..... "	130	
Building Materials, including building stones, granite and marble, brick, drain pipes, tiles, pottery and lime, estimated value about		2,000,000.00
		3,490,799.00

FIRST REPORT OF COMPANY TO ONTARIO BUREAU OF MINES COVERING ALL OPERATIONS TO DECEMBER 31, 1889.

Our No. 1 furnace was blown in for the first time on December 24th, 1888, and ran from that time to December 31st, 1889, 259 days of 24 hours, using 31,268 tons of ore and producing therefrom 3,849 tons of matte averaging probably about 18 per cent. copper and 18 per cent. nickel. In this operation there were consumed 3,560 tons of Connellsville coke, costing about $6.50 per ton at Sudbury. Smelter No. 2 started September 4th, 1889, and ran 73 days from that period to December 31st, using 9,740 tons of ore and producing 1,210 tons of matte averaging probably about 18 per cent. copper and nickel as No. 1. This furnace consumed 1,169 tons of coke, the same per cent. of fuel as No. 1. The matte was shipped by boat from Cleveland to York, Swansea, Liverpool and Hamburg. Shipments have been made from Philadelphia, New Algoma Mills and Thunder Bay to Sudbury; railway to Southburg. The shaft at Copper cliff mine is sunk at an angle of 45° on the 31st of December, 1889, it had reached a depth of 502 feet, and the width of the ore deposit at that depth was 65 feet.



Stuzgeon Falls
23rd May 1884

Hon. Commissioner of Crown Lands Province of Ontario

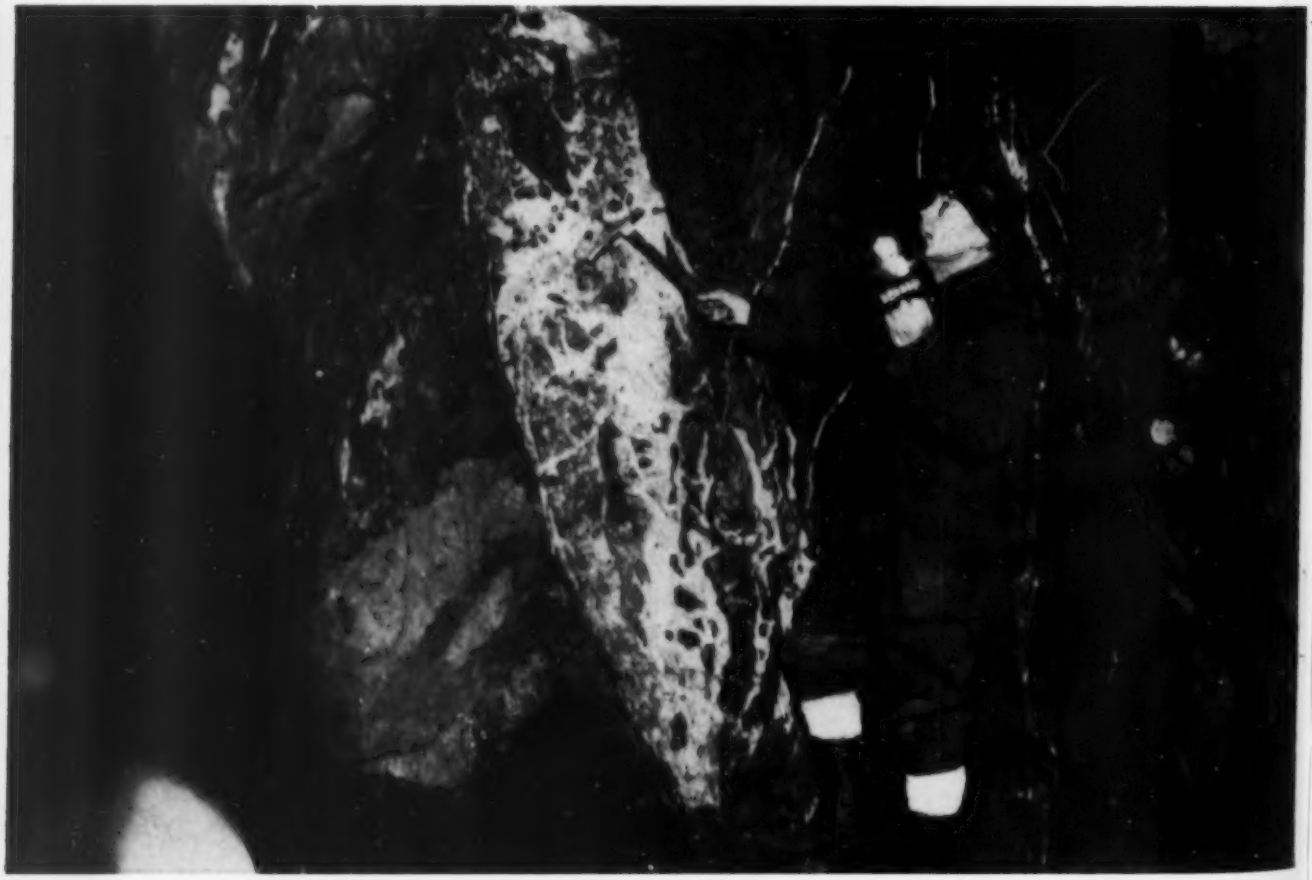
Sir

I beg to apply for the purchase of Lot seven in the sixth Concession of this township of McKim under the provisions of the Mineral Act of Ontario on behalf of Alexander M. Frood of the City of Brantford the purchaser of the same. The affidavits as to it being unoccupied and deposit of purchase money will be forwarded in a few days as soon as the witnesses can be brought in contact with a Commissioner for taking the same. Meanwhile to prevent any doubts as to priority of claim as discoverer I forward the foregoing.

I am respectfully
Thomas Frood

Photostat of original applications of Thomas Frood for the lot which is now the famous Frood Mine.

Drillers at entrance to White Eagle mine.



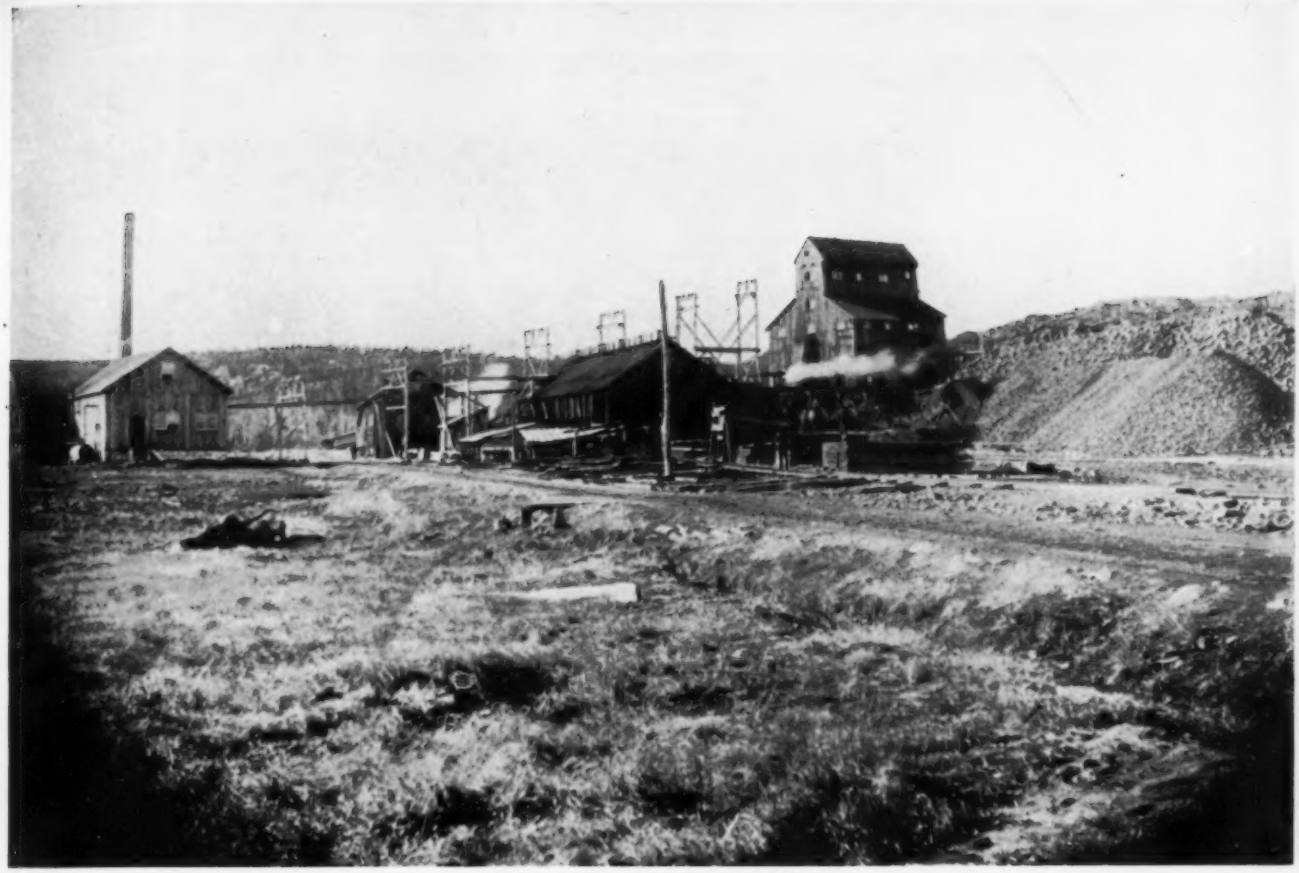
White Eagle Silver Mines, Ltd. A silver vein 25 inches across, assaying as much as 2,000 oz. silver to a ton of ore.

White Eagle silver samples.

White Eagle silver mine.

First tennis court, Copper Cliff. Game in progress.

Opening of Copper mine. L. H. Ashman, Supt. C. C. Co., R. Frood, behind, H. P. McIntosh, treas., W. A. Hooker, and, sitting on rock, Archibald Blue. Boy standing not mentioned.



Copper Cliff Smelter and Mill.

Manhé Converter brought form Europe by Vivians—for use at Murray mine.

Frood mine.

copper sulphide joining with it in a solution similar to that formed when sugar is dissolved in coffee. This solution is lighter than the molten nickel sulphide which has been but slightly affected by the presence of the soda. Consequently, when the molten metal is tapped off into ladles, the nickel sulphide being heavier settles in the bottom of the ladle. When the contents have cooled sufficiently to solidify, the ladles are dumped and it is found that there is a well-defined fracture or line of cleavage between the copper-soda tops and the nickel sulphide bottoms.

In operation this process is divided into two stages. In the first treatment a cupola furnace is charged with matte, coke, and the copper tops from the previous second treatment and the results of this are first copper tops and first nickel bottoms. In the second treatment similarly, a cupola furnace is used being charged with bottoms from the first treatment, with nitre cake and soda as flux. The tops from the first treatment are transferred to a basic-lined converter where the soda is removed as recovered salt cake and the copper residue is transferred to an acid-lined converter where it is again oxidized by air blast and the sulphur removed as sulphur dioxide gas. Here also any nickel content is oxidized and slagged off, and the copper, blown to blister.

A modern and interesting development in the fields of metallurgy and transportation is the conveying of molten copper over considerable distances. This feat is a recent accomplishment in transferring the red metal from the Company's smelter to the Ontario Refining Company, INCO's refining unit, over a mile away. Molten copper at temperatures in excess of 2300°F. is poured from the huge converters at the smelter into the container illustrated above. This is actually a cylindrical furnace on wheels which, having received its white-hot charge of liquid metal, is drawn by an electric locomotive to its destination where the operation is reversed. The molten copper is rapidly emptied into the waiting anode furnaces, by revolving the portable furnace, and the metal subsequently cast into anodes for electrolytic refining.

Interesting features of design are the massive construction; special refractory lining, and the auxiliary equipment for tilting. To offset the danger of freezing the metal is kept at the desired temperature by means of oil burners which function even when the furnace is en route. When carrying a normal load the total weight is approximately 210 tons.

The nickel sulphide produced as above is shipped in box cars to the Port Colborne refinery where it is crushed in ball mills, screened and leached with water to remove the sodium sulphide. After the moisture has been reduced it is transferred to sintering machines where most of the remaining sulphur is burned out. The result is a nickel oxide sinter which is mixed with low sulphur coal, melted in oil-fired reverberatory furnaces and poured into moulds that cast 425 lb. anodes.

At this point in the refining of nickel we enter upon the most interesting feature in the whole process. Heretofore it has been a succession of what might be called a heat process, consisting of reverberatories, blast furnaces, and converters, and from this stage forward these are left behind and electrolysis enters into the metallurgical picture.

In a large room containing hundreds of electrolytic tanks, nickel anodes 96 per cent pure are turned into cathodes containing 99.96 per cent pure nickel. The interesting part of the process is, that whereas the electric current passes directly from anode to cathode, the sulphate bath in which the process takes place travels about 1000 feet in passing from its contact with the anode to that with the cathode. Yet, anode and cathode are suspended in the same tank at a distance of 2— inches from each other.

It may be interesting to describe what actually happens in the electrolytic tank. The electrolytic action releases various ions from the anode and brings them into solution, the minute particles of the platinum metals dropping, however, to the bottom of the tank as the surface of the anode is pulled apart. Among the ions brought into solution are those of copper, iron, etc., which go to make up the 4 per cent impurity of the anode. Hence it is essential to draw off this solution before it reaches the surface of the cathode, and remove these impurities by both physical and chemical processes.

The cathode sheet is therefore suspended in a canvas bag which is sufficiently water-tight to maintain a hydrostatic head within the bag thus maintaining an outward flow of the electrolyte. The foul solution around the anode is piped to a room beyond the tank room where it is

purified and then returned as pure nickel sulphate to the cathode bag. There the transverse current from positive anode to negative cathode (which is not affected by the canvas partition or by the counter flow of the Electrolyte) impinges on the surface of the cathode, carrying the nickel ions of the pure sulphate. With an area of 972 square inches, the cathode builds up at the rate of eight pounds every twenty four hours; and when it reaches a weight of 125 pounds it is removed and cut up into the required market sizes.

At Clydach, Wales, a product equally pure is produced by a totally different process, known as the Mond or Carbonyl process. This process, the invention of the famous metallurgist Dr. Ludwig Mond, is based on the fact that when carbon monoxide gas is passed over freshly reduced nickel oxide, at temperatures around 80 degrees Centigrade, a compound Ni. (CO4) is formed and this nickel carbonyl, when heated to a point just below 200 degrees Centigrade, decomposes, yielding nickel and carbon monoxide.

Because it is the natural alloy of the great copper-nickel deposits of the Sudbury district, "Monel Metal" merits at least brief consideration in any account of production methods in the nickel industry. This wonder metal owned its inception over a quarter of a century ago to the fact that the ores of the Creighton Mine contain twice as much nickel as copper and that in this proportion a natural alloy was produced with certain properties well adapted to very important uses in engineering, building, and food handling equipment. A large plant situated at Huntington, West Virginia, has been in operation for many years producing this popular metal in its many forms.

The attached table indicates the various uses of nickel and its alloys, and also shows the percentage content of nickel in the different alloys, it being understood that reference is made entirely to INCo. products. The table does not show the comparative amounts of nickel consumed through the different outlets, but it may be of interest to point out that the steel mills of the world take currently over fifty percent of the total output of nickel.

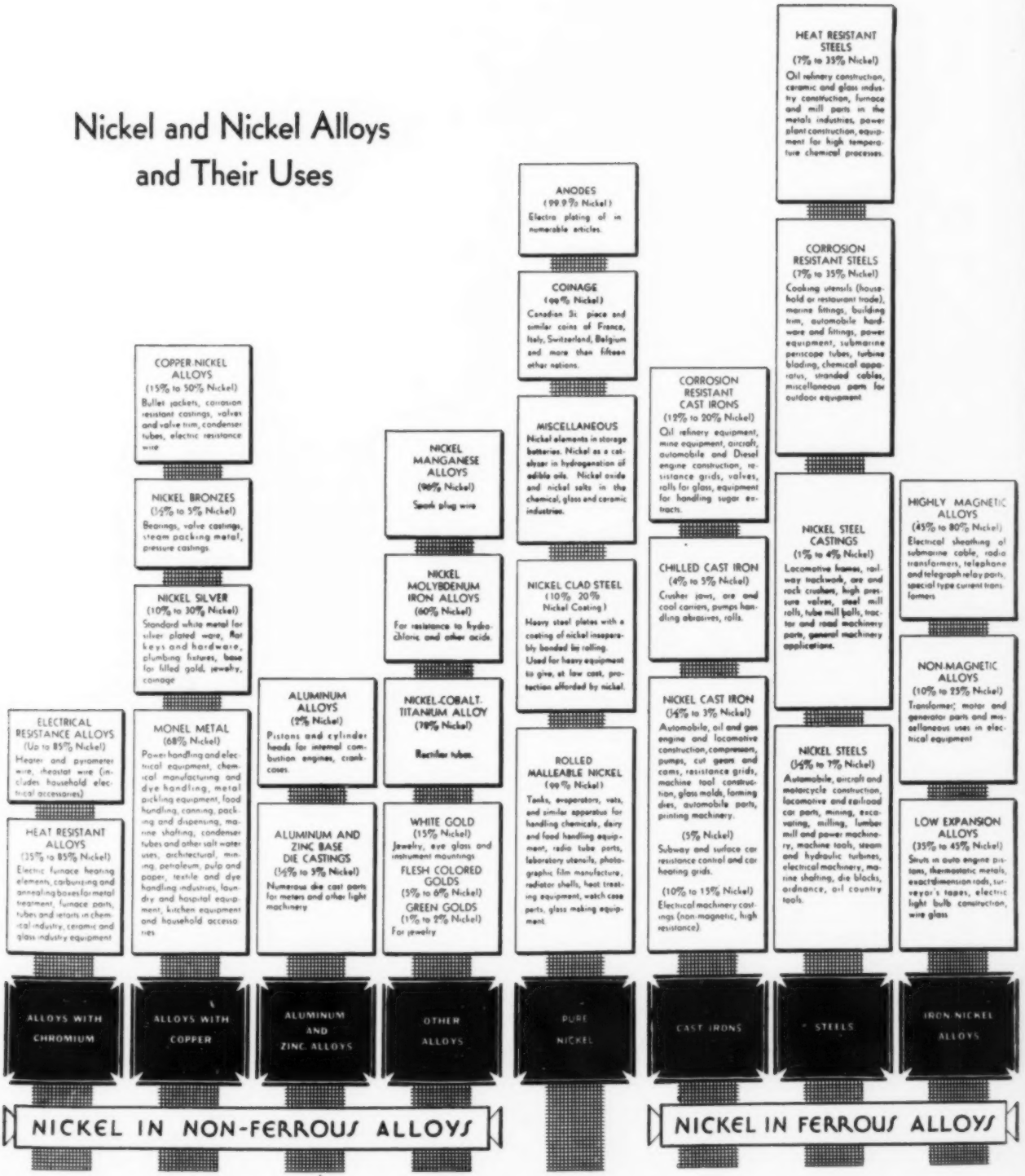
During the year 1935 sales of nickel in all forms by INCo., including nickel in alloys, amounted to 129,850,207 pounds. Other metals included sales of copper — 233,009,392 pounds, gold — 69,944 ounces, silver — 3,160,222 ounces, and platinum metals — 128,874 ounces.

It is obvious that the mining, smelting, and refining of such huge quantities of metals, means a great deal to the industrial life of Canada, and may be indicated in condensed form by the following compilation of salient facts regarding the operations of The International Nickel Company of Canada Limited.

1. Capital expenditure in Canada for ten years, 1926 to 1935 inclusive..... $54,100,000.
2. Wages and Salaries, year 1935.. $10,900,000.
3. Supplies purchased in Canada, year 1935 ..... $8,100,000.
4. Coke purchased from Algoma Steel Co., Sault Ste. Marie, year 1935....145,000 tons.
5. Coal purchased from Nova Scotia, year 1935.....225,000 tons
6. Lumber and timber purchased from Canadian sources, year 1935.....42,000,000 bd. ft.
7. Sodium Sulphate purchased from Saskatchewan, year 1935.....18,000 tons
8. Freight payment to Canadian Railways, year 1935..... $3,500,000.
9. Market development and research annually over..... $1,000,000.
10. Average number of employees, year 1935 1935.....6,989
11. Number of men engaged in bush, operations on lumber and timber for INCo..... 820
12. Metal exported 1935.....315,700,000 lbs.
13. Limestone purchased from Medonte, Ontario, 1935.....89,599 tons
14. Number of Common Shareholders, December 31, 1935.....80,174

Truly, "tall oaks from little acorns grow", particularly when the oak, representing in this case the nickel industry, had its roots firmly embedded in the productive pre-Cambrian rocks of Northern Ontario; protected in its sapling days by the skilled attention of trained scientists and men of business acumen, and nourished throughout to its present magnificent proportions, by intensive and successful metallurgical research.

Nickel and Nickel Alloys and Their Uses



Garson mine.

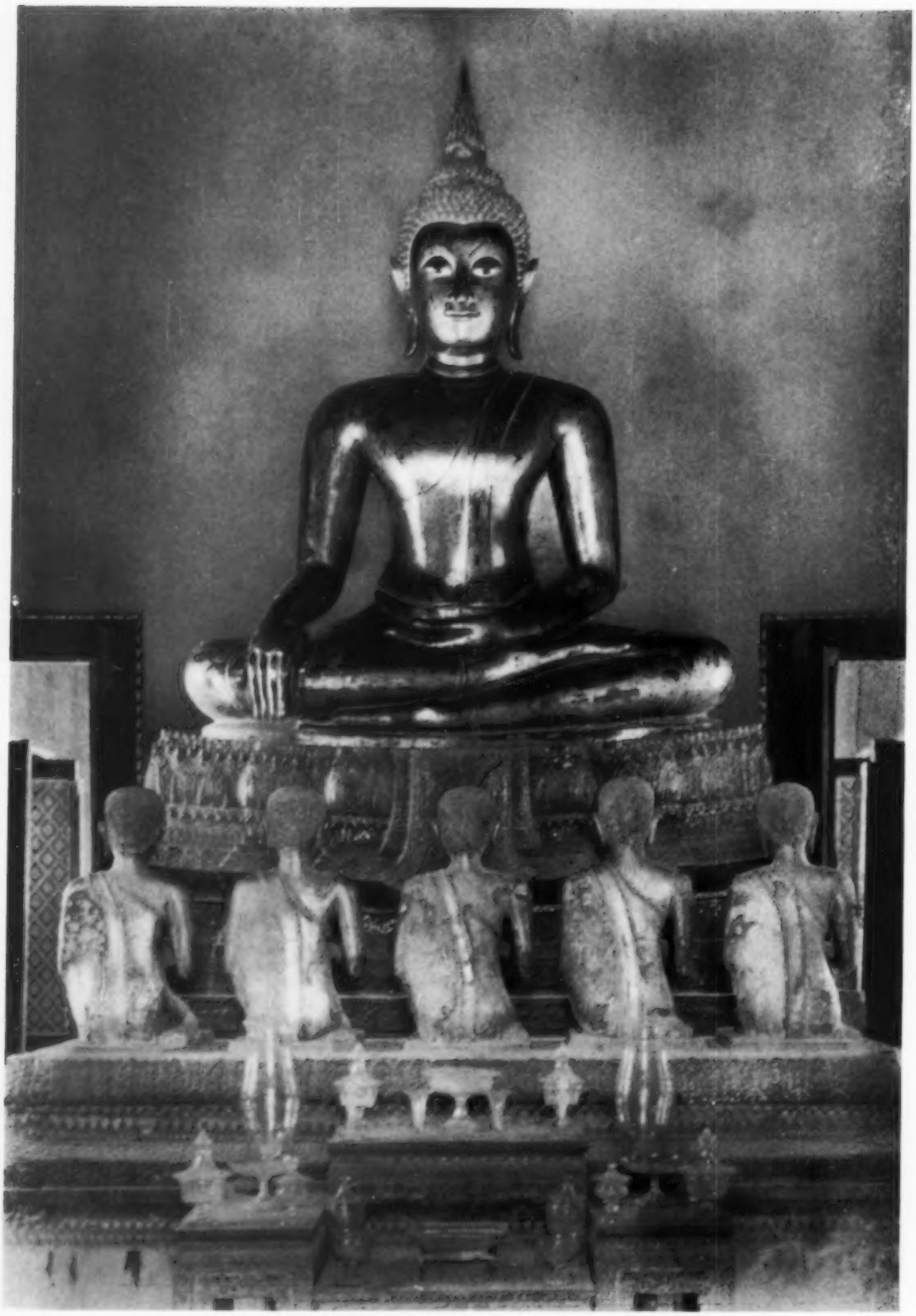
Ontario Refining Co. Plant, Copper Cliff.

City of Sudbury, Ontario.

Levack mine.

Copper Cliff mine, surface plant, 1889.

Creighton mine.



Wat Po—Phra Buddha, Bangkok, Siam.

SIAM—AND ITS SNAKE FARM

by **J. WALKER BARTLET**

I REACHED Siam (Muang T'hai) by way of a tender from an ocean liner. We journeyed from the ship to Paknam where we landed and proceeded by electric train from that village to Bangkok. One could have travelled by canal from the coast to Bangkok had one wished to do so, for a canal, its surface dotted with native boats, runs the whole way to the city. We decided, however, to take the train which crawled through a low-lying, level land, green and warm and with a luxurious growth of tropical foliage. It is a drowsy, raw, untamed and forest-covered country, and in its depths lurk many different kinds of animals and reptiles. Besides dense jungle, however, there are wonderfully fertile plains where the finest rice in the world is grown.

The natives are the friendliest of people, inclined to be small in stature and with skins slightly darker than the Chinese in colour. The kindliness of their disposition would seem to exclude the possibility of caste and they are the only people I have ever met who are really socialistic by instinct. They all chew betelnut, with the result that black teeth are seen everywhere. When their expectoration comes in contact with anything solid it is immediately dried in the warm sunshine and so little red spots appear upon stone slabs or concrete used for paving. Black teeth are considered an adornment, but not so, long hair. Accordingly their hair, which is jet black and coarse in texture, is always worn as short as possible and immediately any growth appears upon their chins in the shape of a beard it is plucked out by the root, but some of them grow straggling hairs on the upper lip. The ladies look very picturesque dressed in their "Panungs". This piece of finery, which measures about a yard in width and four yards in length, is wrapped artistically around their bodies from the waist to the knees. They are very adept at beautifying themselves and one could hardly imagine how attractively they can wear this garment. They wear a different coloured "Panung" for every day of the week.

The natives have little or no commercial instinct, but take to farming as naturally as a duck to water. The result of this is that they are nearly all engaged in the cultivation of rice and the commercial trade of Siam is very much in the hands of the Chinese.

Bangkok is a city of Temples and waterways but with few roads; canals, picturesque with movement, take their place. Outside Bangkok there are no roads in Siam. Possibly no other city in existence can compare with Bangkok for magnificence and the barbaric pageantry of its buildings. Oriental temples and palaces vie to outdo each other in splendour. Across the river Menam from Bangkok stands the great porcelain Temple of Dawn, called by the natives "Wat Chang". At this Temple there is a group of five towers, the tallest of which measures about 250 feet. Broken pieces of coloured glass and china are artistically scattered over all these towers and in the brightness of Siamese sunshine the effect is brilliant but tawdry. On the Bangkok side of the river is Wat Po, the Temple of the Sleeping Buddha. Then there is Wat Phra Keo, the chapel of the Emerald Buddha, situated within the precincts of the King's Palace Grounds. It possibly is the most beautiful temple in Siam and is a place of worship for the Royal family. The image of the Emerald Buddha stands on a high and magnificent altar over which hangs a garment studded with diamonds, rubies and precious stones that would make even a King of Cathay gaze in admiration. It is a much cherished national treasure.

We lunched at the Phya T'hai Hotel which was once a King's Palace. It is now the principal hotel of the city and has beautiful surroundings. T'hai is a word much used by the Siamese and of which they are very proud. It means "Free People."

The King's Throne Hall is possibly the finest building in the city. It is quite modern in design and used for Government purposes. Here the King personally met

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Editors Note.—The snake illustrations are in part from a similar snake farm at Butantan, near Sao Paulo, Brazil.

Snakes in the Park at Butantan, Sao Paulo. These particular snakes are harmless, and silent, and frequent evergreen trees in their own special enclosure. They are awaiting birds or butterflies to alight in their vicinity with a patience that appears inexhaustible.

The Snakes are housed in splendid concrete quarters situated in comely grounds, and under the auspices of the Pasteur Institute. Here the most venomous snakes in the World are taken care of.

his Councillors when important work of the Empire had to be transacted. King Prajadhipok, who is a comparatively young man, is very progressive. A bridge was built a year or two ago over the Menam river at Bangkok, and the King personally contributed some £180,000 to its cost. The builders were British, being Messrs Dorman Long & Co. Ltd. It was erected as a memorial to celebrate the 150th anniversary of the establishment of the present reigning line of monarchs. King Prajadhipok was educated at Eton, served in the British Army and has travelled far. His Siamese titles include those of "Brother of the Moon" and "Professor of the twenty-four umbrellas."

There have been three revolts in Siam within the past three years. During the last revolt the King and Queen flew to the Malayan Frontier but returned in December 1933 to open a new Parliament. They are now (accompanied by their little son) living at Knowle Park in the Village of Cranleigh, Surrey, England. In the meantime, Siam is in a state of great unrest with revolution "just round the corner". The King abdicated at the beginning of March. What does he think of it all? Does his renouncement of the throne worry him? I would say—possibly not. The Siamese as a rule fatalistically accept conditions as they come along. One can almost hear him confiding to his Spouse, Queen Rambai, that despite the Jubilee Celebrations for a twenty-five year's Kingship, King-jobs are not so fashionable as they were, and that one must keep up with the times. He is said to be very happy in England where he and his Queen live like ordinary people. From all accounts they are well liked and popular with the inhabitants of Cranleigh.

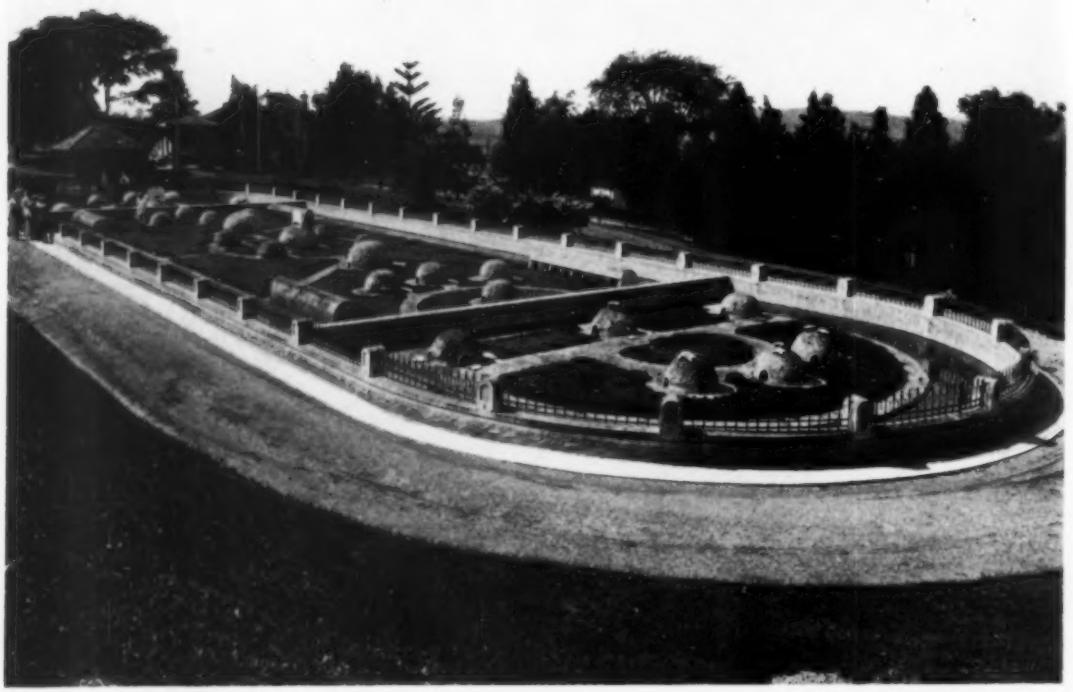
The sacred white elephants of Siam are housed in Royal Stables near the Throne Hall where they lead a life of pampered luxury. They are treated with great reverence because the soul of Buddha is supposed to have been at one time incarnated in an elephant. There are only two of these Sacred Albino Elephants in Siam. They are not really white, but over their body they show streaky greyish patches. The Siamese flag is a White Elephant on a red ground. There are about 10,000 ordinary elephants in Siam and they are used very extensively, particularly for hauling timber in the teak forests.

The natives as a rule do not wear shoes, but patter happily along on their bare feet. Polygamy is still practised in the country, but the first wife has always the place of honour and many favours granted to her are denied to those who have been wed at a later date. The second and later wives are really little more than slaves. They have few "rights" but if they bear a child they acquire a slightly higher status, being then looked upon as a sort of permanent and natural nurse. The taking of a wife is somewhat like buying the proverbial pig in the proverbial poke, for the bridegroom is not allowed to view his bride until the marriage ceremony has been completed; then, in the bridal chamber, he can definitely discover whether his "go between messengers" have the same idea of beauty as he has or whether perhaps for a "little gift in the doorway" they have extolled charms never really possessed by the bride. I have no doubt he thinks it fortunate that if she does not come up to expectations he can always have another "draw" from the lottery bag.

The natives, like the Malays, enjoy cock fighting and fish fighting. The latter, I understand, is as exciting as the former. Tiny fishes (Betta Splendens) are used for this purpose and are so pugnacious that they will generally fight until one of the combatants is killed. To me, however, perhaps one of the most interesting things I saw in Bangkok was the very up-to-date Snake Farm where serums for the cure of bites from serpents are manufactured. The snakes are housed in splendid concrete quarters situated in comely grounds, and under the auspices of the Pasteur Institute. Here the most venomous snakes in the world are taken care of. I did not realise how much moisture snakes required until I saw their quarters. Around the side of the area where are located the two feet high arch-pierced beehive huts, which stand under a fourlegged shelter, ridged cement waterways, some two feet in width, are placed. There, an occasional snake may be seen lying in a spineless knot but generally speaking they shelter in their little huts, their lidless eyes hating the glare of the bright sunshine. The skins of these reptiles, a minute or two after they have left the liquid, are dry, smooth, clean and beautiful.

Demonstrating how the secretion is extracted. It is a tricky business. Massage in the poison glands is resorted to, to assist the venom flow.

The Snake Farm at Butantan, Sao Paulo, where many kinds of poisonous snakes are housed and where their malignity is extracted for the preparation of antivenins. With their lidless eyes snakes must have shade, hence the cement hives with their small side entrances.



There are sixty different kinds of snakes which crawl and wriggle through the coastal rivers, mangrove swamps, mud and ooze of this tropical land. At least twelve varieties of these reptiles are poisonous and woe betides man or beast should they inadvertently find themselves within striking distance of their deadly fangs. I think it is safe to say that specimens of every kind of these poisonous varieties are to be found here from the king cobras, ten or twelve feet in length, down through diversified members of the cobra de capello family to miniature black representatives that, unashamed of their size, raise their heads, swell their hoods and spit vindictively upon the least provocation. Four or five hundred specimens in all are cared for in these snake enclosures under the supervision of a short-haired, black-toothed snake attendant clad in white. Unconcernedly he stalks amongst the writhing creatures, kicking them from his path when they approach too near, his only protection being knee high top boots of Russian leather make and a stick with a metal crook at its end. He has several assistants but this sturdy dark-eyed native, rather above the average height—as a keeper of reptiles—is in a class by himself. One of the sights of a lifetime is to see this individual officiating in the compound upon a day when the snakes are being forced to give up their venom. Opening the gate of the enclosure, he enters and placidly descends into the battling ring. Here he stands by the moat a minute, studying the situation, and then he moves across to a white roofed snake kraal. This he unceremoniously tilts over, releasing perhaps a couple of king cobras or a bundle of Russell vipers, according to the pit he had been called upon to enter. The cobras and vipers are housed in different quarters. On this occasion it is a couple of ten feet long king cobras that have been liberated. Quickly, with a forward drive of the stiff rod he carries, he pins the snake down by placing its metal hook over the dangerous end of a member of one of the most deadly of all the snake tribe. Having achieved this, he stoops down and, with one of his hands, secures the reptile just behind where the staff holds. He now thrusts aside the wand, passes his other hand down the wriggling lashing body and eventually gripping it about four feet above the tail, raises the whiplike mass of twisting, hissing fury well above his head. What strength and what courage! In the meantime, the second snake has crawled dangerously near his vicinity but, with a heavy booted foot, he pushes it a full yard away and moves out of its close environment. It appears to recover itself instantaneously and turns with its unwinking eye already fixed on its adversary, its hood is blown out, its body sways sideways and its tail keeps zig-zagging along the ground. The snake he carries to a Veterinary Surgeon located near the arena. This individual has with him a case which protects a little glass container covered with oiled silk tissue. The container is rubber padded round the edge, as the teeth of a snake are easily damaged. The keeper now, pressing from underneath, forces the jaws of this fearsome monster apart and, with the aid of forceps slips the glass receptable between its teeth. The cobra bites at this contact with all the vindictive fury of its race. The fangs penetrate the topping and aided by massage on the venom glands little greenish yellow drops of fluid can be seen to drip, drip, drip into the container.

"Poison of Asps is under our lips.
"Why do you wrench them apart?
"To learn how the venom makes and drips
"And works its way to the heart".
KIPLING.

When enough of the venom has been extracted from the poison glands, and it does not do to drain the serpent dry, the saucer is removed and sometimes a small funnel-shaped instrument is inserted in its place down which is poured what I was informed was an "egg nog". Whether this was literal or figurative I do not really know, but the quantity of venom drawn off is often enough to leave the victim in a weak state, hence the reason for not draining it to the bitter end and for the tonic afterwards administered. Little food is given to these ophidians because the hungrier they are the more vindictive they become, and the more vindictive they become the more poison can be drawn from their fangs. Snake after snake of varying variety is operated upon in this way until the requisite number of them have given up a quantity of their death-dealing fluid now to be transmuted to a life-saving blood serum.

A venomous serpent used by the Attendant at Butantan, Sao Paulo, for his demonstration as he explained the actions and reactions of the venom through the poison duct. Great care and adroitness is required when handling these fearsome looking reptiles.

A Small Boa. The day was dull or more than likely this fellow would have sought shelter in one of the Kraals.

Once every three or four weeks, this happens, as it takes that time for a snake to recuperate and for a further supply of the liquid to generate. About two years is the average life of a snake under these harassing conditions. Horses are gradually inoculated with the venom. At first the smallest of doses is given, but very soon it is unbelievable how much they can absorb. When their blood has become immune to the poison, a quantity of it is drawn off, and from the serum duly sterilised and medically prepared the anti-venom is manufactured.

The Pasteur Institute has now little distributing centres throughout the whole country, so that any of the rural population who get bitten will not require to go far for an antidote. The saving of life in this manner has been most encouraging. Last year alone something like 600 people were rescued in this way from a horrible death of pain and torture.

Once, when in India, I saw a cobra being fed with a live rat, and it was an interesting sight. A rat was dropped into a cage occupied by a single ophidian. The greater part of this cage was exposed to bright sunlight but there were spots of shade therein. The lidless eyes of the snake evidently could not see in the glare for, hissing furiously, it struck repeatedly and indiscriminately at the rat which, through some inherited instinct, always kept in the bright light. Eventually and accidentally, I think, the cobra at last found its object, whereupon the rat just gave a sort of quiver, curled up its feet and immediately expired. It appeared to be a death both painless and quick. The attendant then removed the dead rat and showed us the tiny pinholes in its side where the fangs had penetrated.

Snake venom as a cure for haemophilia is now receiving considerable attention. It is stated in this connection that the venom of the Russell Viper has a particularly coagulant property, very effective in arresting haemorrhages.

Our friend, the keeper, has been bitten many times and by every possible kind of snake until he has now apparently become immune. He has accordingly got somewhat careless, and it was not really until the authorities commenced to fine him and make him pay for the anti-toxin which he used after a snake had bitten him that he became more careful. The authorities could not afford to take the risk of losing a man of his value and fearlessness, so that every time he was bitten he had to be inoculated as a precautionary measure. He is quite an institution in Bangkok.

In April of this year, I visited Sao Paulo in Brazil, which takes pride in its attractive but bizarre Snake Clinic at Butantan a suburb of the city.

I travelled up from Santos, a two hours run on what is possibly the cheapest railway journey in the world. The return fare (50 miles each way) costs somewhere in the vicinity of 75c. I found the Snake Park at Butantan much like the one in Siam with its kraals, green lawns, and wide moats. The snakes, however, were different—larger as a rule with rattlers that turned their heads and "warned" ominously. There were also several half-grown Boas undulating lazily along.

There are a number of snakes in this park—harmless, thin, and silent that frequent evergreen trees placed for them in their own special enclosure. Here they camouflage themselves so perfectly that the tree has to be studied very carefully before the eye can separate them from their surroundings. They run true to their instincts and await birds, butterflies, or any living thing to alight in their vicinity, but, if it was not for the kindliness of the keepers, I am afraid they would all go supperless to bed. Every tree in this little compound has its quota of Ophidians and so the birds, etc., that frequent the district have learned the danger of approach and keep away. The snakes, however, just keep hanging around for their 'would be victims with a patience that appears inexhaustible.

VENUS FLY TRAP

by **BERNARD L. KOBEL**

Known to botanists as the Dionaea Muscipula, but commonly termed the Venus Fly Trap, the plant is unusual regardless of which name you may call it. It is not a common plant, yet it grows in many sections of North America and is rather well known.

The leaves of the plant are covered with sensitive hair-like triggers and when a fly or other insect touches or alights upon these, it simply means that said insect will soon become just another meal for the plant — because it lives upon fluids sucked from these insect victims.

So fast are the movements of the leaf in closing that the insect has little chance of escape and human eye cannot perceive all the movements in closing. Only the high speed possible with a modern movie camera enabled the photographer (who was endowed with great patience) to record this set of prints actually showing the Venus Fly Trap making a catch and a kill.

1

2—3

(1) A fly alights upon the sensitive leaf of the Venus Fly Trap (Dionaea Muscipula) and all unknowing that in a fraction he will be just another meal for the plant.

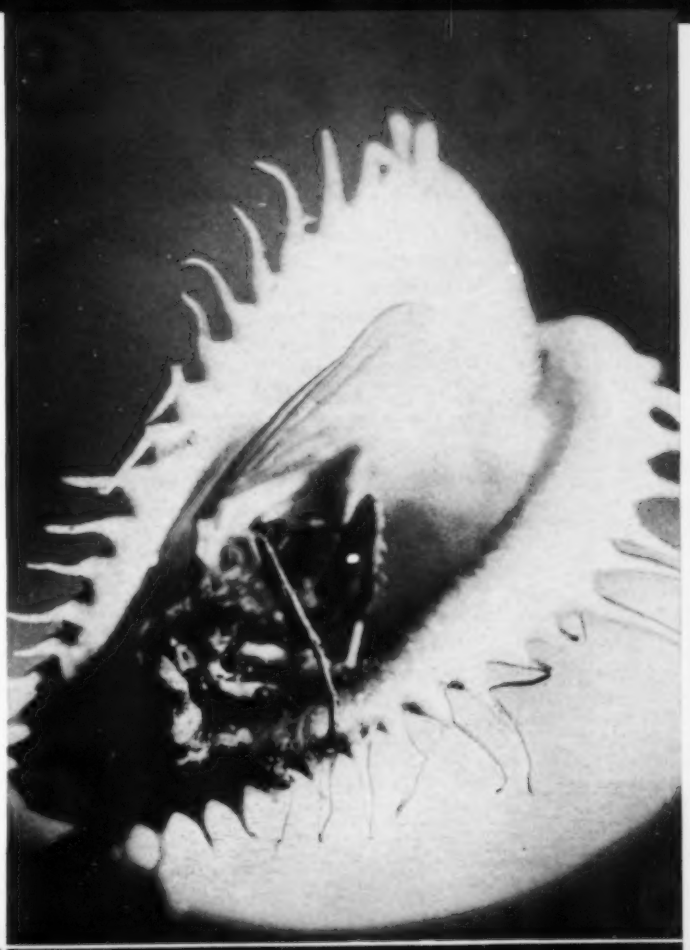
(2) You will perceive that the edges of the plant here are turning in for an encircling movement over the fly.

(3) There is a further closing about the fly in this view and the fly makes no effort to escape because this has all been so sudden.

(4) By this time the bar-like Cilia have shut off all avenues of escape.

(5) The Venus Fly Trap now settles down for a nice meal upon the fly which you have seen it capturing. The plant lives upon the juices of insect victims.

(6) Having sucked the carcass dry, the leaf expunges it (after a week or so) and is now ready to repeat the process again.



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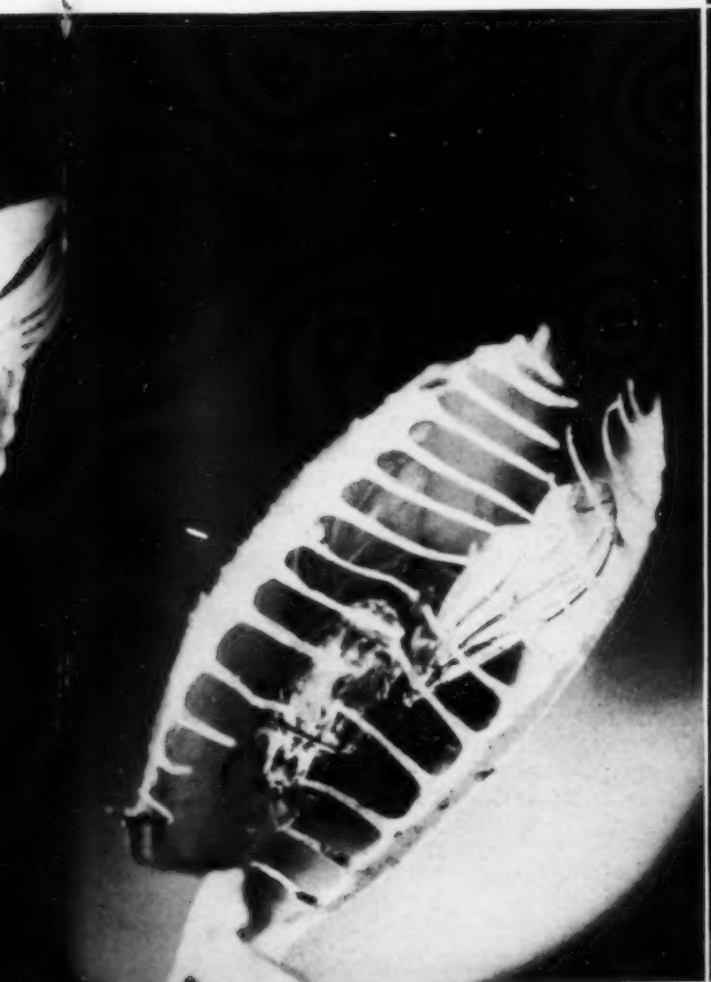
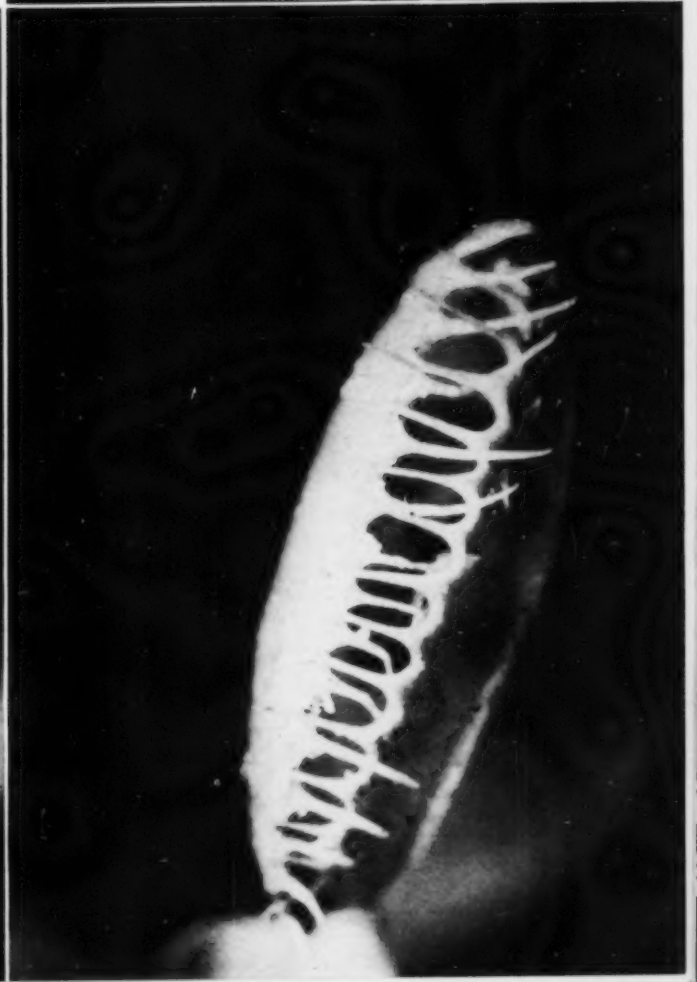




EDITOR'S NOTE BOOK

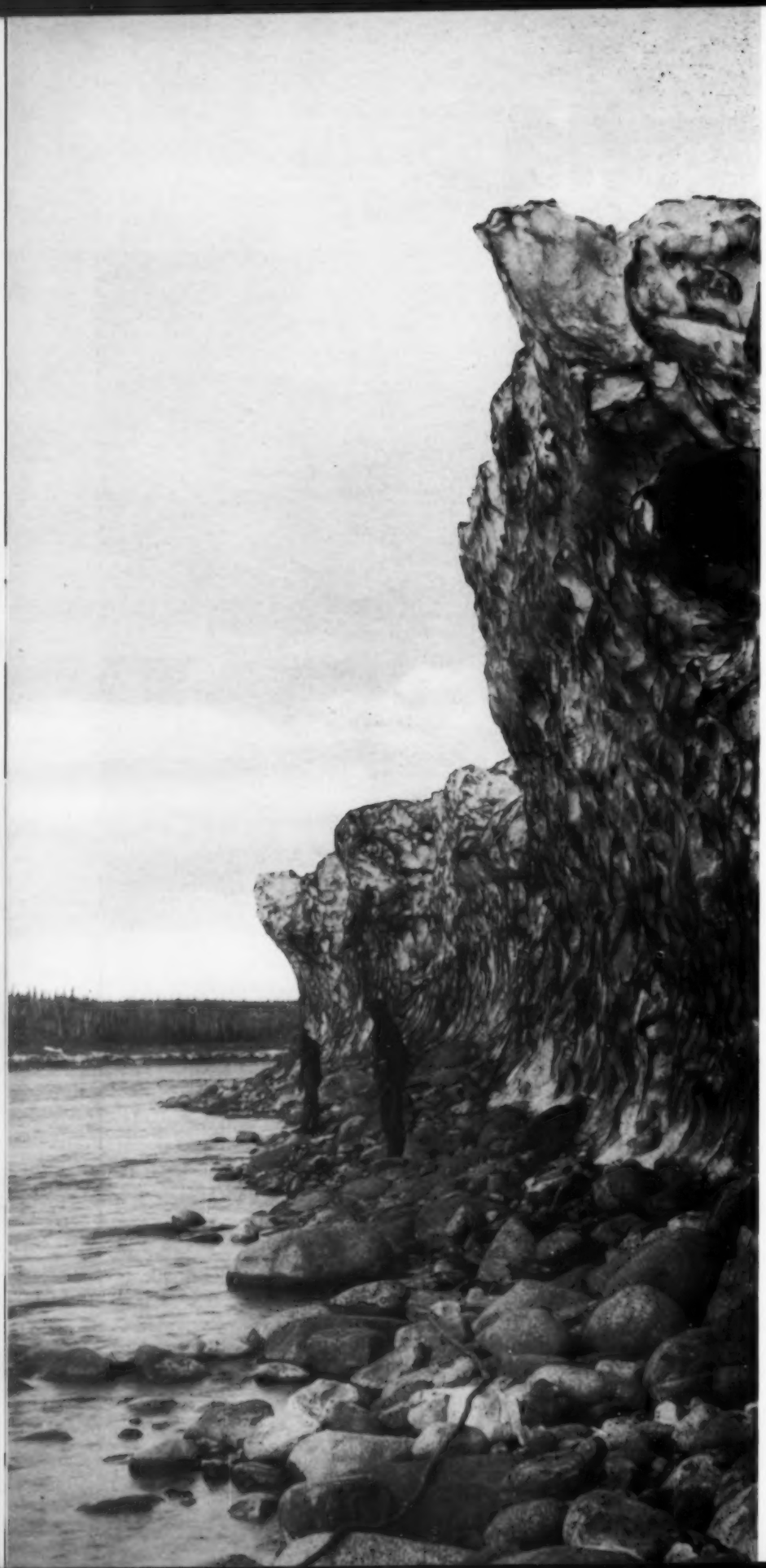
Mr. A Stanley Deaville, who superintends activities of the Philatelic Division of the Post Office Department at Ottawa, and contributes the article entitled "Canadian Geography and Stamps", was formerly assistant superintendent of the Canadian Air Mail Service. His literary contributions to the more technical phase of philately include an authoritative book, "The Colonial Postal Systems and Postage Stamps of Vancouver Island and British Columbia, 1849-1871." During the Third International Philatelic Exhibition, the intrinsic merits of this illustrated monograph won for its author a special silver medal. Mr. Deaville has contributed many articles to stamp magazines under the nom-de-plume of "Lewis Ravenscroft."

The Post Office Department, under the direction of the Hon. J. C. Elliott, B.C.L., D.C.L., K.C., M.P., Postmaster General, has fully recognized the advantages to be derived from the maintenance of a philatelic division, as there is a wide demand for new issues and other literature from stamp collectors in every country. Particular care is exercised in the design and production of Canadian postage stamps, whenever a new issue is necessary or deemed desirable, as they constitute one of the foremost advertising mediums for this Dominion throughout the world.

Mr. E. A. Collins who contributes an article entitled "Canada's Nickel Industry" in this issue, was born at Smithfield, Northumberland County, Ontario; graduated from Queen's University in Mining and Metallurgy in 1905. He went to Copper Cliff with the old Canadian Copper Company in May 1900. From 1906 to 1913 he engaged in mining operations throughout the United States and Canada and from 1913 to 1918 was Assistant to the Inspector of Mines, Province of Ontario. Mr. Collins returned to Copper Cliff with the International Nickel Company in 1918 where he has remained and where for some years he has been Assistant to the Vice-President and General Manager. He is a member of the Trustee Board of Queen's University and of the Engineers' Club, Toronto; Vice-President of Canadian Institute of Mining and Metallurgy. Mr. Collins "when time permits plays at golf."

Richard Finnie, who contributes in this issue "Modern Pioneering in Canada's Western Sub-Arctic" was born in Dawson City, Yukon Territory. Since his first polar expedition in 1924 he has spent many years in the region of which he writes. Mr. Finnie is well known throughout North America not only for his writings but as a lecturer. During the past decade he has produced some 25,000 feet of motion picture films for the Canadian Government, photographed and edited by himself, comprising ethnographic studies and official records of polar expeditions. In 1934 independently, he made the survey of transportation and mineral development in the Western Arctic and sub-Arctic of which he writes in this issue. His article is illustrated mainly by photographs taken by himself using a Rolleiflex camera on Agfa film.

Canadians participating in a trade mission to China and the Far East, planned by the Canadian Chamber of Commerce for the early part of next year, will have an opportunity of visiting Siam, several features of which are described in this issue. In view of the interest now being displayed in the commercial relations between this Dominion and the Orient. the publication of an article pertaining to China is under consideration for the November issue. Leaving Vancouver on January 19, 1937, the mission will visit the Hawaiian Islands, Japan, China, Hong Kong, Singapore, Siam, French Indo-China and, for those members wishing to see something of Manchukuo and Korea, an optional extension tour is provided. Return to Vancouver on April 7 is planned.



An unusual "shot" of the Ice Cliff at the Rapids, Bear River by Richard Finnie.

AMONGST THE NEW BOOKS

NORTHERN LIGHTS

Prof. Carl Stormer has directed attention to a prevalent confusion between the north magnetic pole and the point on the earth where the magnetic axis meets the surface. Thus, in the supplement to Nature of May 16, 1936, it is stated on p. 813 that "It is the distance from the magnetic axis of the earth that counts, and that axis meets the surface of the earth at the north magnetic pole, which is in the island of Boothia in Canada"; this should read as follows: "It is the distance from the magnetic axis of the earth that counts and that axis meets the surface of the earth about midway between the north magnetic pole and the north pole." This point is near North-Western Greenland, and it might be named the north axial pole. The zone or belt of greatest auroral display has this point for centre on the earth.

To many Canadians our sister Dominion Australia, is a *terra incognita*. Those who wish to know something of the island continent from an authoritative source cannot do better than to read C. PRICE CONGRAVE'S *North Australia*. (London, Jonathan Cape, 1936, 10/6). The author has spent fifteen years in the administrative service of the Territory of North Australia, and has travelled in almost every part of its vast and largely mysterious area. In addition to topographical information there are unusual stories of the people, whites and aborigines, its explorers and pioneers, its animals and sport, its fishing and pearling, its off-lying islands and uncharted rivers. A sketch of the Territory's early history is followed by a description of the country as it now is and a discussion of its peculiar problems and future possibilities.

Quebec where ancient France lingers, (Toronto: Macmillan of Canada, 1936, $2.50) is a book unique in format and in its richness of material and illustration. Here MARIUS BARBEAU crystallizes in poetic prose all the haunting charm of the "dim rich city" so gloriously commanding its long sweep of the St. Lawrence. Mr. Barbeau says: 'On each renewed visit to Quebec some reminiscences of the old days rise before me as out of a treasure chest." And from his treasure chest come pouring many jewels of description, of history, of legend, of folk-song, and of the handicrafts of needlework, of silver-smithing, of wood-carving, which make the past and present of Quebec a vivid picture in our minds.

The numerous illustrations are reproduced from paintings, photographs, et hings, pen and pencil drawnings. In Ma jorie Borden, Mr. Barbeau has found an artist who shares his love for Quebec and its people and who in her charming cover-design, end-maps, and many drawings, catches the lilt and rhythm of th· folk-songs and the quaintness and simplicity of the life of the habitant where France does indeed linger on.

It is interesting to note that this book as to its manufacturing process is a type entirely new to Canada. It is produced in duo-tone on especially heavy woven stock by Photo-Repro, a special form of photo off-set lithography never used in this country before, and in which Macmillans of Canada are the pioneers.

MINERAL PRODUCTION OF ONTARIO IN 1935

Product		Quantity	Value
METALLIC			
Gold	oz.	2,220,171	$45,894,998
Exchange equalization			32,168,332
Silver	oz.	6,317,341	4,069,573
Copper in matte exported	lbs.	12,544,439	627,222
Copper, metallic and in concentrates, exported		239,483,489	18,668,734
Nickel in matte, in speiss, and in ore exported; metallic nickel; and nickel content of oxides and salts	lbs.	138,516,240	35,345,103
Platinum metals	oz.	190,107	5,407,398
Selenium	lbs.	75,363	144,697
Tellurium	lbs.	14,275	65,094
Bismuth	lbs.	7,079	6,796
Cobalt in metal, oxides, salts, ores, and residues	lbs.	679,943	512,224
Lead in concentrates exported	lbs.	22,532	706
Chromite	tons	798	9,576
Total			$142,919,462
NON-METALLIC			
Actinolite	tons		
Arsenic, white	lbs.	2,558,789	75,326
Diatomite	rons	100	4,600
Feldspar, crude and ground	tons	8,656	75,003
Fluorspar	tons	225	2,700
Graphite, crude and refined	tons		78,500
Gypsum	tons	38,247	164,807
Sulphur	tons	13,292	132,920
Mica	lbs.	509,826	7,144
Mineral Waters	Imp. gals	19,900	1,477
Natural Gaz	M. cu. ft	8,150,000	4,895,000
Peat	tons	1,340	9,380
Petroleum, crude	lbs.	165,040	346,156
Phosphate	tons	70	60
Quartzite and quartz	tons	83,034	120,005
Silica Brick	M.	394	22,976
Salt	tons	320,003	1,698,508
Talc	tons	13,710	138,161
			$7,772,723
STRUCTURAL MATERIALS			
Cement, Portland	lbs.	1,243,836	$1,752,148
Hydrated Lime	tons	23,379	226,146
Quicklime	tons	197,793	1,477,555
Sand and gravel	tons	7,332,884	1,683,162
Sand-lime products			135,493
Stone: limestone, trap, granite sandstone	tons	1,977,695	1,751,514
Slate	tons		
Total			$7,026,018
CLAY PRODUCTS			
Brick, face	No.	28,424,000	545,917
Brick, common	No.	19,989,000	269,109
Brick, fancy and ornamental	No.	13,000	728
Brick, Sewer	No.	60,000	970
Tile, drain	No	4,216,000	98,939
Tile, structural, roofing and floor			156,281
Sewer pipe, copings, flue-linings, etc.			196,647
Pottery			51,000
Haydite and crude clay			7,093
Total			$1,326,684
TOTAL VALUE of Mineral Production in Ontario in the year 1935			$159,044,887

Refer article "Canadian Nickel Industry", page 257).

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Central Austrialia forms the subject of an excellent study by H. H. FINLAYSON, entitled *The Red Centre, Man and Beast in the Heart of Australia.* (London: Angus and Robertson, 1935, 7/6).

Exploring the Stratosphere, by GERALD HEARD, (Toronto: Nelson, 1936, $1.00), is a very exciting book. Step by step the author unfolds for us man's latest quest and makes clear the what, why and whither of stratosphere exploration. Since the earth's surface offers little further scope for discovery men's thoughts have turned to the sky. "The way up is the one way open to exploration. Man is an adventurer and danger never keeps him back".

So from the time in 1894 when Teisserenc de Bort at Trappes discovered the stratosphere, the quest has gone on, first with balloons and skillfully-designed instruments, which yet were unable to answer the many questions raised by their records, until Dr. Piccard by his epochal flights proved that man could enter the stratosphere. A graphic chart on page forty-seven shows the altitudes attained in twelve celebrated ascents made since 1901. Photographs of some noteworthy balloon flights and the interior of gondolas illustrate the complexity and terrific risks involved in these enterprises.

Chapter three deals with the uses of the stratosphere in its aid to safer flying, in radio broadcasting, in weahter forecasting and other possible developments. Mr. Heard discusses also the possibility of stratoplanes and rocket flight. Finally, in chapter 4, he expounded the meaning of the stratosphere and how it will add to our knowledge, particularly in the study of that profound mystery, the cosmic rays. To the "average reader" this little book of ninety-eight pages is a revelation. One lays it down with an exultant sense of at last attaining an intelligent grasp of a modern scientific problem.

The recent conquest of Mount Waddington, after several unsuccessful attempts, gives added interest to the latest issue of the *Canadian Alpine Journal*. (Club Secretary, MAJOR W. R. TWEEDY, Vancouver, 1936, $2.00). From its coloured frontispiece of Mount Assiniboine to the book reviews and club proceedings which round it out, the volume is replete with interest. One turns first to the articles on Mount Waddington, recounting the experiences of the Sierra Club of California in their *almost* successful ascent in 1935. Don Munday, who was its discoverer in 1925, writes an article on glaciers of the Mount Waddington region illustrated by superb photographs, of which there are many in this volume, and another on West of the Klinaklini River. There are descriptions of climbs up the Leaning Towers of the Purcells, a ski ascent of Mount Balfour and a winter climb up Mount Edith Cavell. J. W. A. HICKSON contributed a moving account of "*The Disaster on Nanga Parbat in 1934*" and K. P. KIRKWOOD's article, "*Mountaineering in Japan*," provides an excellent review of the literature of Japanese mountaineering. Of particular interest to alpinists and tourists visiting the Canadian Rockies is the Checklist of the Mammals and Summer Birds of Yoho Park.

Things Chinese have always had a fascination for occidental minds, and this interest has been almost painfully accentuated since the events of the last few years. A timely aid in the study of this great nation is the *Atlas of China*, compiled by ALBERT HERMANN, professor of historical geography in the University of Berlin. (Cambridge, Harvard University Press, 1936, $5.00). This atlas constitutes a geographical history of China told in a series of maps, indicating boundaries, cities and other features of the various periods. Another series shows modern China, its resources, industries and communication routes, as well as political boundaries. Prehistoric sites known in China are the subject of one map, the ages of the sites shown by symbols.

Houghton Mifflin have put us all in their debt by their recent re-issue of that great modern classic *Mont Saint Michel and Chartres*, by HENRY ADAM (Boston: Houghton and Mifflin, 1936, $3.00). Ralph Adams Cram says of this book: "The thirteenth century lives in its pages, its gaiety, its youthful ardour, its childlike simplicity and frankness. We foregather with the Abbot and his monks, crusaders and pilgrims, pay our devoirs to fair French queens, dispute with Abelard . . . Its is one of the most distinguised contributions to literature which America has thus far produced".

Florence E. Forsey.

The Canadian Geographical Society

OTTAWA, CANADA

The Society's ambition is to make itself a real force in advancing geographical knowledge, and in disseminating information on the geography, resources, and peoples of Canada. In short, its aim is to make Canada better known to Canadians and to the rest of the world.

As one of its major activities in carrying out its purpose, the Society publishes a monthly magazine, Canadian Geographical Journal, which is devoted to every phase of geography — historical, physical, and economic — first of Canada, then of the British Empire and of the other parts of the world in which Canada has special interest. It is the intention to publish articles in this magazine that will be popular in character, easily read, well illustrated and educational to the young as well as informative to the adult.

The Canadian Geographical Journal will be sent to each Member of the Society in good standing. Membership in the Society is open to anyone interested in geographical matters. The annual fee for membership is three dollars.

The Society has no political or other sectional associations, and is responsible only to its membership. All money received is used in producing the Canadian Geographical Journal and in carrying on such other activities for the advancement of geographical knowledge as the funds of the Society may permit.